OFF-ROAD VEHICLE USE AND ISSUES IN THE YUKON

Prepared by David Loeks

for the Yukon Fish and Wildlife Management Board

November, 2000

Off-Road Vehicle Management Series: Report #1

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The author gratefully acknowledges the helpful comments of the access management committee, while accepting responsibility for the content and recommendations of this report.

FOREWORD

The Yukon is a big place with a small population and it would seem an unlikely region for problems with off-road vehicles in relation to wildlife and habitats. Yet, for the past few years, public concern about such disturbances has been received by both the Yukon Department of Renewable Resources and the Yukon Fish and Wildlife Management Board.

This is a very tricky issue because it involves impacts that are difficult to assess, together with potentially limiting public access, which is a highly controversial topic. The first step in addressing this was taken in 1997 by the Department of Renewable Resources, which commissioned a background report on what had been done elsewhere in Canada.

Subsequent discussions with the Yukon Fish and Wildlife Management Board lead to the formation of an Access Management Working Group, which narrowed its mandate to dealing solely with the impacts of off-road vehicles on fish and wildlife and their habitats.

In order to get a better picture of what is really happening in the Yukon, the Access Management Working Group commissioned a second report to investigate the Yukon situation and provide a basis for further actions.

Following completion of the second report, the Access Working Group hosted a one-day brainstorming session to produce a strategy for addressing this issue. The two background reports plus the results of this session are presented in this document to give Yukoners a sense of where we are at and what we plan to do.

One thing that really stood out from the background work was that the Yukon enjoys a very enviable position in that off-road vehicle impacts are evident but not extreme and there is an opportunity to create good management solutions before serious damage is done.

Therefore, we hope you will read this report and provide the board with comments that will help us to understand the situation better and to manage off-road vehicle activities wisely in the future.

Lawrence Joe
Chair, Access Management Working Group

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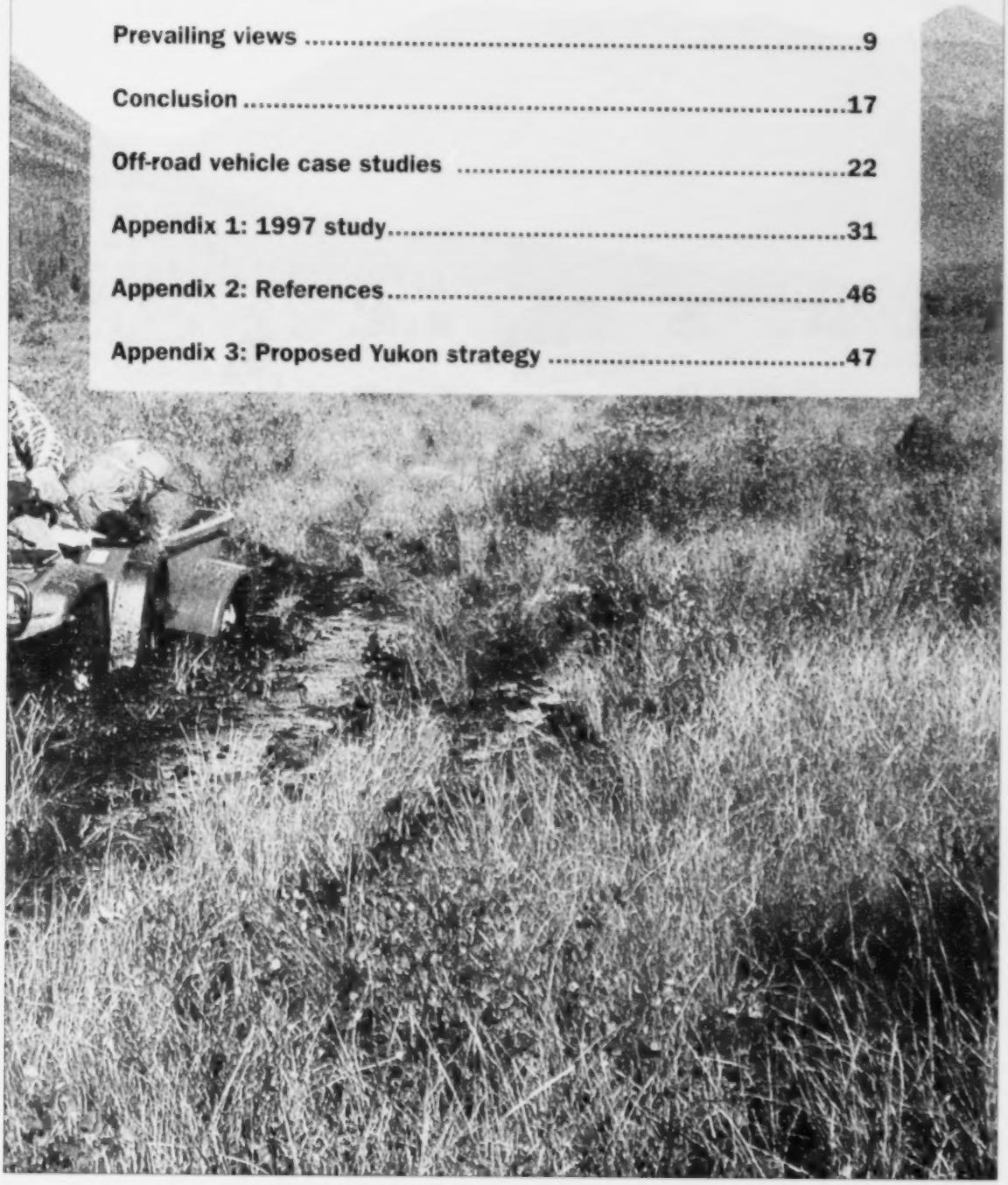

INTRODUCTION

In 1997, the Government of the Yukon's Department of Renewable Resources commissioned a report which surveyed the issues associated with off-road vehicles in Newfoundland, Alberta, British Columbia, Alaska and the Yukon and examined the range of management responses which have been employed. This report, *Off-road vehicle use in the Yukon: Issues scoping study for the Yukon Department of Renewable Resources, Loeks, 1997*, appears in Appendix 1.

As a follow-up to that study, the Yukon Fish and Wildlife Management Advisory Board instructed its Access Management Committee to produce another report examining whether, and how, these issues related to off-road vehicles occur in the Yukon, with a particular focus on questions affecting fish, wildlife, and habitats. The Access Management Committee therefore commissioned this current study to document the types of off-road vehicle issues and concerns; document specific instances of off-road vehicle impacts on fish, wildlife, and habitats; identify possible solutions; and develop three scenarios describing off-road vehicle impacts which could be used as case studies for a workshop.

It was agreed to concentrate on issues and impacts in the Mayo, Whitehorse, and Haines Junction districts, while providing an opportunity for people from across the Yukon to provide information.

Approach

It is well known that some off-road vehicle access-related issues are based on emotional and aesthetic reactions to machinery from

non-motorized backcountry recreationists and hunters. These are serious public concerns, but they were not the prime focus of this study. This report attempts to stress objectivity in identifying and analysing the issues. It concentrates on off-road vehicle related issues which have demonstrable impacts on fish and wildlife, or their habitats. These issues inevitably reflect the differing values and interests of those who use off-road vehicles, and those who don't.

For the purposes of this study, First Nations, Renewable Resource Councils, communities, interest groups, and individuals throughout the Yukon who were likely to have first-hand experience with the issues were contacted. In addition, discussions were held with resource management officers; conservation officers; Yukon government regional biologists, habitat specialists and wildlife management biologists; the Yukon Trappers Association; the Yukon Fish and Game Association; the Wilderness Tourism Association; Yukon outfitters and off-road vehicle retailers

Overview of recommendations

Across North America, it has been shown that off-road vehicle use causes impacts, and that these impacts give rise to issues concerning whether or how they can be prevented or mitigated. Off-road vehicle use is widespread in the Yukon and impacts have been observed throughout the territory. At present, there is reliable information about where impacts occur, but details are sparse. Information about the occurrence and effects of off-road vehicle impacts in the Yukon should be systematically collected so that these issues can be better understood and so that management efforts can be well directed. However, incomplete information is not the same as no information. Even without complete data, resource managers in the Yukon should be prepared to apply remedial actions in situations where there is reasonable concern for the conservation of wildlife, vegetation, soils and water. It has been shown time and again that it is more costly, difficult, and time consuming to correct damage to resources than it is to prevent it.

DEFINITION: In this study, "off-road vehicle," also known as ORV, means motorized vehicles which permit overland travel beyond which a conventional two-wheel drive vehicle cannot go. This study considers 4x4 trucks, dirt bikes, three- and four-wheelers, argos, tracked vehicles, snowmachines and hovercraft. It does not include heavy equipment, jet boats, conventional motorboats, and aircraft, which also provide access to the backcountry beyond the point which a 4x4 can go. The case studies examine situations in the Yukon in which off-road vehicles play a part.

Off-road vehicle issues are best addressed by a collaboration of local entities and territorial resource managers. A common Yukon-wide body of regulatory tools is needed. These can be locally applied as needed to prevent or minimize off-road vehicle impacts. If this is to be effective, legislative means are needed to regulate the use of off-road vehicles by all people in recreation, hunting, and resource exploration. Regulatory authority must be provided to accomplish the following sorts of optional measures:

- trail closures;
- area closures;
- exclusion of off-road vehicles from designated types of habitats and land forms; and
- designated off-road vehicle routes and prohibition of off-trail travel.

Renewable Resource Councils, First Nations, resource users, public interest groups, and resource management professionals all have an interest in the management of public lands. Although off-road vehicle issues would be best addressed within the context of regional land-use planning, local bodies such as the Renewable Resource Councils are capable and positioned to coordinate the broad discussions needed to fairly and effectively protect and manage Yukon resources.

Finally, public education is fundamental to any successful program to improve resource management. Off-road vehicle riders should understand and apply skills for reducing their impacts. Both off-road vehicle riders and non-motorized recreationists should learn about the values and interests of each other to lay foundations on which public resources can be fairly and respectfully used and managed.

IMPACTS AND ISSUES

It was beyond the means and scope of this study to discover all the occurrences of off-road vehicle impacts in the Yukon and to unravel their meaning as public issues. However, there is more than enough information to show that off-road vehicles are a legitimate concern throughout the Yukon.

Impacts caused by off-road vehicles

Across North America, including in the Yukon, off-road vehicles contribute to the following kinds of impacts:

- damaged soils and vegetation (scarred and defaced landscapes);
- damage to wildlife habitat;
- proliferation of unplanned trail networks (unwanted access to wilderness or to key habitats);
- stressed and/or displaced wildlife;
- increased hunting pressure and risk of overharvest;
- increased access and harvest pressure on small and remote stocks of fish;
- conflicts with non-motorized hunters and recreationists (noise, commotion, aesthetics, values).

Not all of these impacts occur in all places. Not all occurrences of an impact are serious or significant. Not all off-road vehicle drivers are the same; a skilled and sensitive driver can produce fewer or lower levels of impacts than a careless driver. On the other hand, skilled drivers may tend to be more adventuresome and extend trail networks while penetrating more remote areas.

Almost every off-road vehicle use produces some effect. Alaskan studies in Wrangell-St. Elias National Park show that vegetation damage, soil compaction and/or breakage can occur with just one pass of an off-road vehicle. Alpine soils, wet and marshy soils, and caribou lichen are especially vulnerable, as are most soils on steeper terrain. The first pass may be slight, but the severity of damage mounts quickly with repeated passes. The noise of one off-road vehicle may be inconsequential, but at some point a level of intensity can be reached in certain places which can seriously stress wildlife. Education and off-road vehicle codes of conduct have played a role in reducing impacts of recreational and subsistence off-road vehicle use in Wrangell-St. Elias National Park and Katmai National Monument in Alaska.

Off-road vehicles and snowmachines are facts of life in the Yukon for work, hunting, and recreation. It is also a fact that some of the impacts associated with off-road vehicle use in the Yukon are unavoidable. But some off-road vehicle impacts can be reduced or minimized — and some might be avoided altogether. The question to examine is whether these impacts — or the potential for them to occur — should be managed in the Yukon.

Differing points of view play a large role when considering the need for management. Some people think of off-road vehicles fondly as "a poor man's horse." Others compare them to helicopters — slower, but they get you way back there where boats and airplanes won't. Both comparisons are applicable in part, and both have limited validity. Off-road vehicles and horses, for instance, cause similar impacts on soils and vegetation. If this comparison is valid, it would be appropriate to manage the use of horses and off-road vehicles similarly. But off-road vehicles and snowmachines are more readily accessible to the average person. Further, they produce noise and sometimes group sizes unknown to horse parties, and they drastically extend the range of travel.

The comparison with helicopters also has validity. In a relatively short period of time, off-road vehicles can reach places which once could only be reached with considerable toil, time, and bush skills. If this comparison is valid, then it follows that in some circumstances the use of off-road vehicles for hunting, like the use of helicopters, should be regulated.

Where off-road vehicle impacts are observed

Off-road vehicles are used across the Yukon. The initial study estimated that there were between 4,000 and 5,000 off-road vehicles in the Yukon and about 11,000 snowmachines. Retailers indicate that sales continue to grow. Off-road vehicle and snowmachine ownership is widespread among First Nations and non-First Nations alike, and are put to similar purposes: hunting, fishing, work, and recreation. Impacts from these machines can be seen the length and breadth of the Yukon.

- In Beaver Creek on the Alaska border, off-road vehicles have churned wet permafrost terrain on Scotty Creek into a gumbo, which will be visible for decades. These impacts exceed what a resource management officer would tolerate from a land-use permit holder. Argo tracks have deeply rutted the Koidern wetlands.

- Just over MacMillan Pass on the NWT border, off-road vehicle tracks crisscross the tundra, and young people from the Yukon have been seen using the off-road vehicles to chase down caribou. The Campbell Highway and spur trails off it bisect the heart of the Finlayson caribou herd. From the air, in late winter, a dense network of snowmachine tracks can be seen.
- Near the B.C. border, off-road vehicles leave existing mining trails in the upper Rancheria and establish new trails in the alpine zone.
- On the Arctic Coast, off-road vehicles travel the beaches of the offshore barrier islands.
- Between Haines Junction and Whitehorse, and beyond to Teslin and the South Canol Road, horse trails and hiking trails have been widened into machine trails. Mining and forestry trails have been used to provide access to the alpine zones containing sheep, caribou and moose. The trails are obvious from the ground and from the air. Use of these trails increases yearly as knowledge of the routes becomes more common and machines become more capable.
- In Mayo, overgrown mineral exploration trails have been reopened by increasing off-road vehicle use largely from outside the area. Each new mining track becomes a new hunting corridor. In the Clear Creek watershed, the Hart River caribou herd is now accessible in the fall and trails in their range are expanding. Local residents are concerned that the Mayo area is especially vulnerable to overhunting because of its increasing reputation as an off-road vehicle destination.
- In Dawson, the entire mining district is a well-known off-road vehicle mecca for moose hunters. Off the Dempster, off-road vehicle parties follow the Hart River trail deep into the Hart watershed to hunt for caribou.
- In Haines Junction, hunting opportunities have shrunk. Kluane Park limits access, focusing off-shore vehicle use into a few productive areas. Moose in Granite Creek, Marshall Creek, and Red Squirrel Creek are thought to be overharvested, as are some accessible sheep ranges.
- The Dawson Trail between the Pelly and the Stewart rivers has become a destination for off-road vehicle hunting "expeditions."
- Yukon resident sheep hunters are divided on whether off-road vehicles are ethical, and whether they should be zoned, or perhaps even prohibited from use in sheep hunting.
- North of Faro, off-road vehicles have accessed one of the most important moose habitats in the region. It is reported that a D-6 Cat was used to open an unauthorized trail for off-road vehicle hunting. There is concern that hunting efforts may become too focused and that overharvest may result.
- In the Whitehorse-Southern Lakes area, widespread recreational snowmachine use has displaced moose from preferred habitats in subalpine valleys. Biologists are concerned that recreational traffic may inhibit the recovery of the Southern Lakes caribou population.

- Around every Yukon community there are belts of trails which have become off-road vehicle playgrounds. In many places, conflicts with non-motorized recreation has become an issue.
- Of-road vehicles and snowmachines are seen at outfitter camps, traplines, fishing camps, and mining exploration camps in every corner of the backcountry, from the Arctic coast to Old Crow, to the Ogilvies, to the LaBiche in southeast Yukon. They are transported by aircraft, or taken by boat to even more remote places.

These snapshots show a pattern of dispersal in the Yukon similar to those experienced in Alaska, British Columbia, Alberta, and Newfoundland. As the initial report discussed, by the time that impacts in these places become serious issues for land managers, wildlife managers, politicians, First Nations, and the general public, they are difficult to solve. Although public awareness in the Yukon is growing, there has been little public discussion about off-road vehicle use and their impacts.

The answer to the question of whether the impacts that have been observed in the Yukon are serious and warrant management depends on a variety of factors.

- In some cases, it depends on the "eye of the beholder." Are trail ruts in the alpine zone or in a wetland bad?
- In some cases, it depends on the volume of use. A few machines near a wildlife concentration might be tolerated, but a lot of machines might not.
- In some cases, it depends on the responsibility of the user. A machine travelling slowly and at a distance from an animal is not harassment, but one going too close and too fast is.
- In some cases, it depends on the time of year. Rutting or calving, or nesting periods are more sensitive times for animals; the spring is a more sensitive time for soils and vegetation.
- In some cases, it depends on where it occurs and what is affected. Impacts acceptable in one place may be outrageous in another place with high spiritual, cultural, natural, wildlife or recreational values.
- In some cases, it depends on what seems fair. A large percentage of sheep hunters surveyed in the Yukon want places where they can enjoy non-motorized sheep hunts in peace. A common concern among many off-road vehicle owners is that any regulations should apply universally, to non-First Nations and First Nations alike. Most people are concerned with fairness.

In almost every case, it also depends on who is asking. There is a vast gulf separating the values and outlook of the average off-road vehicle user from the average non-motorized hunter or recreationist. But this gulf must be bridged, because politicians and managers of public lands are accountable for the integrity of the resources entrusted to them. Moreover, managers and political leaders are responsible for addressing conflicts between legitimate users of public resources. The documented examples of B.C., Alberta, and Alaska serve to heighten the

responsibility of Yukoners to avoid needless deterioration of public resources and needless confrontation among the public.

Despite differences of values and perceptions about the use of off-road vehicles, it is possible and necessary to determine standards for acceptable levels of impacts. In some cases, standards may be the product of negotiation between competing user groups. In other cases, they may be the result of reasonable judgments by wildlife biologists or other qualified experts. In yet other circumstances, standards may emerge from the contributions of advisory bodies and associations. In order for off-road vehicle issues to be addressed, these issues must be identified, specific information about issues and occurrences must be obtained, and a process for public discussion should be provided.

PREVAILING VIEWS

Based on interviews conducted for this study, there appear to be two prevailing views regarding off-road vehicles in the Yukon.

Off-road vehicle users generally do not agree that off-road vehicle impacts are a "problem." Their standard assertion is that 99% of off-road vehicle use is on existing trails and that the benefits off-road vehicles provide by facilitating outdoor lifestyles more than compensate for any impacts they cause. They further assert that new damage to soils and vegetation — over and beyond what was caused by the original trail — is visually negligible and insignificant to wildlife. They hold that willow and dwarf birch in the subalpine zone normally bend but don't break when they are driven over, and that when breakage does occur, these shrubs grow back quickly.

Off-road vehicle users also believe that damage to soils and vegetation in the alpine zones is merely cosmetic, and that conflicts with non-motorized users can be resolved if those people stop being judgmental and fussy. They strongly believe that hunting issues are matters of allocation and harvest limits, not matters of access. In their view, off-road vehicle hunting benefits wildlife management by distributing hunting pressure. The risk of wildlife disturbance, and the occurrence of impacts in general, can be reduced by educating off-road vehicle users in better techniques. Off-road vehicle owners think it is unfair to "pick on them" out of all the various resource users who cause impacts to the landscape.

Generally, hunters and recreationists who do not use off-road vehicles don't like them. They

believe there are serious threats to wildlife resulting from off-road vehicle use, including vegetation and soil damage, disturbance and displacement and overhunting (both by licensed and First Nations hunters, in localized areas and widespread). They cite instances where off-road vehicle trails have spread into untouched country and where scars to the landscape are clearly visible after only brief off-road vehicle use. Some hold that off-road vehicle hunting undermines wildlife management by distributing the hunting pressure, thereby eliminating untouched "breeding pockets." Conversely, some are concerned that off-road vehicle hunting can dangerously concentrate pressure on seasonal aggregations and at vulnerable times and places. Most feel that the very presence of machines destroys the qualities they seek in hunting and in backcountry recreation: peace, quiet, and a spiritual connection with nature and the land.

Two widely differing conclusions arise from the same set of "facts." Is one point of view more "objective" than the other? Compared with other jurisdictions, there is little solid information about off-road vehicle use in the Yukon, although there are many observations. No researcher or agency has monitored the vehicle use of trails, studied instances of wildlife displacement, quantified habitat loss, or estimated the net disturbance experienced by any wildlife population. No one can state how many animals are hunted from off-road vehicles. The Mandatory Hunter Report doesn't ask that question. Lack of information does not mean impacts are not occurring, nor does it mean that the impacts are insignificant. Wildlife biologists and resource managers agree that reliable data do not exist and that decisions may have to be made despite uncertainty if the Yukon intends to prevent problems as opposed to reacting to them.

Off-road vehicles have been used in the Yukon for decades, so there has been a tendency to believe their effects are understood, predictable, and acceptable. Compared with other places, the level and intensity of off-road vehicle use in the Yukon has been low. Because of this, impacts have accumulated incrementally, and public awareness has lagged.

The gradual awakening of public awareness in the Yukon contrasts with the explosive growth of off-road vehicle use experienced elsewhere which thrust their impacts into the forefront as public issues. For instance, Anchorage alone has some 25,000 off-road vehicles, compared with the Yukon's estimated 5,000. In southcentral Alaska, there is little doubt that off-road vehicle impacts require management, although there is debate about what is best to do.

Any off-road vehicle use creates an "impact." No matter how careful the rider, off-road vehicles compress and break soil structures. Off-road vehicles damage vegetation, and bring noise and human activity into wildlife habitats. The critical question is knowing when and how these impacts should be managed. Resource managers in many parts of B.C., Alberta, Alaska, and Newfoundland waited until the levels of impacts had become obvious. Intervention at this stage was not easy; damage to lands and resources had become difficult to repair, public concern was vocal, and the divisions between off-road vehicle users and other recreationists had become sharp. In retrospect, managers in these jurisdictions feel that the impacts warranted attention well before the public became aware of them.

Indicators of use

Overall, off-road vehicle use and information about their use in the Yukon appears to be below a threshold which produces widespread concern. Here are some indicators.

- There is no information to allow the conclusion that long-term or chronic wildlife displacement has occurred because of off-road vehicle use. An exception to this is the problem connected to snowmachine use around the Southern Lakes caribou herd which is the result of urban and suburban concentrations adjacent to highly accessible habitats.
- There is no information to allow the conclusion that measurably significant habitat loss due to vegetation destruction can be attributed to off-road vehicles.
- Some wildlife managers and conservation officers express the opinion that off-road vehicles have a beneficial role in distributing the harvest and relieving pressure from game populations easily accessible by road and motorboat.
- The inventory and harvest data in some areas, such as Mayo and Dawson, with high off-road vehicle use, generally indicate sustainable populations and harvest levels.

Indicators of concern

On the other hand, from across the Yukon come expressions of concern about off-road vehicle impacts. Here are some indicators.

- The Mayo Renewable Resource Council considers its area vulnerable to serious overharvest if off-road vehicle hunting increases or if off-road vehicles gain access to key habitats.
- The Alsek Renewable Resource Council considers that off-road vehicles have made possible the serious overharvest of moose in winter aggregations around Granite Creek and Red Squirrel Creek, and behind Paint Mountain and Marshall Creek. One member believes that sheep populations on their trapline have fallen by one-half since off-road vehicle access began.
- Moose populations in remote and inaccessible parts of GMZ-7 (east of Kusawa Lake) remain high, while populations in off-road vehicle accessible parts are in serious decline.
- Despite an initially successful predator control program, the highly accessible Finlayson caribou herd is declining again, and increased hunting appears to be a major factor. Calf to cow ratios are within the range of stable populations with natural predation. The decline appears among the adults.
- Half of sheep hunters surveyed want controls on off-road vehicles to protect their opportunity to have a high-quality hunting experience.

Do off-road vehicle impacts warrant management attention in the Yukon? On both sides of this question are indicators and strongly felt opinions. For example, it is likely that hunters on off-

road vehicles have been instrumental in overhunting and depressing some populations. On the other hand, off-road vehicle supporters maintain that the problem is not off-road vehicles. It is that managers have allowed too many animals to be shot and that permits are needed.

The present lack of solid information on this question does not demonstrate that off-road vehicle impacts in the Yukon are absent or trivial. Rather, this reflects that off-road vehicle impacts have not been a research priority. The observations and concerns of some Renewable Resource Councils, field biologists, and other backcountry observers are early indicators that the time for ignoring off-road vehicle impacts has passed, if the experience of western provinces, Newfoundland and Alaska is any guide. It is responsible, efficient and effective to take precautionary measures to limit impacts on the basis of the judgment of informed and qualified people. Experience elsewhere shows that failure to do this in time will produce more serious consequences later.

Defining the problem

Although there is a lack of data for most of the indicators bearing on off-road vehicle issues, people still have strong opinions about what — if anything — to do about them. That these opinions are conflicting and contradictory is to be expected because of the differences in values discussed earlier. There are also regional differences in how off-road vehicles are used, differences in how off-road vehicle issues are defined, and differences in how people approach solving public issues.

Off-road vehicles seem to both concentrate the harvest and disperse it. In Haines Junction, the routes suitable for off-road vehicle hunting are confined by topography, vegetation, the proximity of Kluane National Park and management restrictions. Consequentially, hunting pressure is concentrated into a limited number of access routes and localized overhunting has occurred. By contrast, in Mayo and Dawson the abundance of usable roads and trails tends to disperse the harvest compared with the patterns of the early 1980s.

Off-road vehicle issues can be viewed and defined quite differently. One view is to consider off-road vehicles as contributing to a biological problem — chiefly wildlife management problems, including unsustainable harvest levels, and impacts leading to displacement, disturbance, and habitat degradation. Another view is to consider off-road vehicles as contributing to a social problem — wildlife management problems plus allocation questions, user conflicts, aesthetic objections, and damage to soils, vegetation, and viewscapes.

Biological problem: As a biological problem, the crux issue is to manage the abundance of game and the diversity of wildlife. Off-road vehicles can be seen as a tool that makes hunting easier and more effective. Off-road vehicles can help to distribute harvest, but they can also lead to both localized and widespread overharvest. If people want to *influence* harvest trends, then limiting or regulating off-road vehicles is one of several approaches. This approach reflects one of the leading principles of wildlife conservation: do not escalate the efficiency of methods for

taking game. To achieve conservation purposes, the combined effect of management actions to limit the harvest and to limit off-road vehicle use may be needed.

Social problem: As a social problem, the question is no longer limited to harvest management and preserving wildlife abundance. If one accepts that it is important to preserve the land from defacement and to preserve opportunities for non-motorized hunting and recreation, the question widens to become one of land use management. In addition to considering wildlife populations, a broader land-use approach addresses how the backcountry looks, is used, and is experienced by people. In this context, the many impacts caused by off-road vehicles become important, and so do the conflicting values and aims of all resource users.

By expanding the problem definition, the logic of solutions leads to zoning and trail restrictions to reduce conflicts, and to regulations to limit or eliminate impacts on soils, vegetation, wetlands, and on all wildlife. The broader purpose of a land-use approach is to see that off-road vehicle impacts do not add up over time, changing the look and "feel" of the backcountry in unwanted ways and reducing the diversity and abundance of its wildlife.

Processes for addressing off-road vehicle issues

There are two ways to address off-road vehicle issues — through voluntary measures and through regulations. Both have been successfully used in other jurisdictions.

Voluntary measures are based on education, discussion, and compliance by those involved. Regulations are based on authority provided by legislation. Legislation is sometimes an expression of broad social and political consensus about the need to act and about the range of acceptable actions. Sometimes legislation results when political leaders accept evidence that action is needed, regardless of general consensus. Regulations often are the means to implement recommendations coming from public bodies, informed people, and technical experts.

In the Yukon, the Umbrella Final Agreement and the respective responsibilities of the federal, territorial, and First Nations governments require consultation and cooperation on many land management issues. Several bodies and processes could offer means of providing recommendations for addressing off-road vehicle issues.

- *Renewable Resource Councils:* These councils are constituted in each traditional territory by the Final Agreements. They bring together substantial local knowledge of land and resource issues and conditions. By collaborating with other regional experts including biologists, resource managers, conservation officers, hunters, trappers, guides, and others active in the backcountry, these councils can offer detailed local information about issues and devise recommendations based on this.
- *Local and regional land use planning processes:* Although the Yukon has limited experience with land use planning, local planning bodies, once established, should offer the most comprehensive process for addressing the full range of off-road vehicle issues.

- *Protected Areas Strategy:* Planning for the Protected Areas Strategy involves substantial local and regional participation. The sort of input required will likely involve a broad cross-section of resource interests. This may provide a forum for identifying and recommending solutions to off-road vehicle issues in areas which are sensitive or which have important resource values.

- *Forest management planning:* Authorized by the Umbrella Final Agreement, but not yet implemented, forest management planning can complement or possibly even substitute for land use planning in some traditional territories. The bodies which will support forest management planning, including the Renewable Resource Councils, can offer means of identifying off-road vehicle issues and solutions.

- *Community committees:* Any community can form a committee to address off-road vehicle issues or any other topic. If it is broadly based, well informed, and uses open procedures, a community committee can be an effective way to provide information and recommendations to all governments.

It should be apparent that the Renewable Resource Councils are the only existing consultative bodies with standing and recognition at this time.

Options for managing the issues

Yukoners recognize that there are many off-road vehicle issues but have suggested only a few practical options for actually managing them. Many people recommend voluntary measures; others would supplement these with regulations in certain situations. In many regions, a selection from these approaches may be appropriate. It should be noted that the legislative means to regulate the recreational use of off-road vehicles is extremely limited in the Yukon. The *Wildlife Act* provides a means for regulating the use of off-road vehicles by non-First Nations hunters only, and regulations have not been drafted for appropriate sections of the *Environment Act*.

What follows are some of the suggested options.

- *Exclude off-road vehicles from certain categories of lands:* As used elsewhere, this approach might prohibit off-road vehicles off-trail in the tundra, subalpine zones, and wetlands. Or it might prohibit off-road vehicles in critical habitats and sensitive vegetation. This tactic has been used successfully by several jurisdictions to reduce off-road vehicle impacts on land, vegetation, water, and wildlife resources while generally preserving opportunities for their use. It presumes the right to operate off-road vehicles anywhere— unless they are explicitly excluded. This approach requires good mapping and inventories of the resources to be protected and, in the Yukon, it would require its own legislation. It is an effective way to conserve resources and to preserve the interests of non-motorized backcountry users if it applies to all members of society.

- *Limit off-road vehicles to designated routes, and prohibit them off-trail:* This variation on the exclusion establishes that off-road vehicles can be operated only where permitted. This has been especially used in areas with high levels of competition with non-motorized recreationists, and to enable off-road vehicles to operate responsibly in areas with sensitive resource values. This has been partially tried in the Ruby Range, where certain trails are designated as access routes for hunters using off-road vehicles.

- *Limit the number of off-road vehicles in an area at any time:* This option attempts to limit disturbance effects — either to wildlife or to other resource users. It would require a permit system for off-road vehicle use. It only partially addresses the interests of non-off-road vehicle users.

- *Educate off-road vehicle riders on how to minimize impacts:* An education campaign is used in most jurisdictions and is a basic element of any management approach. Off-road vehicle associations typically support education, as they wish to be seen as promoting responsible riding.

- *Ignore off-road vehicle impacts, but limit harvests in defined places, if need be:* This approach does not address off-road vehicle impacts and concerns at all. It attempts only to regulate wildlife harvest levels to preserve or restore targets of abundance. To be effective, it requires the cooperation and enforcement of First Nation governments. It does not address wildlife displacement, disturbance and habitat damage, and thus may not be sufficient to preserve abundance in areas with high recreational use.

- *Ban off-road vehicles completely:* This option is offered by people who, because of their aesthetic and ethical value systems, are deeply opposed to off-road vehicles. It is also employed by resource managers for special categories of public lands, chiefly to protect ecological reserves or to provide opportunities for non-motorized recreation. While effectively eliminating the range of off-road vehicle impacts, this blanket approach raises issues of fairness and enforcement. It is usually applied sparingly for well-founded objectives. This approach is beyond the purview of the *Wildlife Act* and would require legislation.

Principles

There is little agreement on which option is appropriate in which circumstance. However, general principles to guide decision-making emerged from discussions. Any approach to off-road vehicle issues should be necessary, fair, effective, simple, and implemented locally. These principles deserve a closer look.

- *Necessary:* "If it ain't broke, don't fix it." Almost everyone agrees that regulations which are not needed are obnoxious. Some situations are so trivial that it is heavy-handed and intrusive for managers to get involved. But many people caution that it is too late to correct some things if you wait until it is "broke." Genuine data is essential for some cases, but in other situations valid indicators will do.

- *Fair:* No one wants to feel disadvantaged or made to bear an unequal burden of regulations or consequences. Off-road vehicle hunters do not want regulations that exempt First Nations. Non-off-road vehicle hunters and recreationists want undisturbed places to enjoy just as off-road vehicle owners want places to enjoy their machines.
- *Effective*: Regulations (or the decision not to have regulations) should produce expected benefits and should avoid unwanted consequences. Clear — and accepted — management objectives are required. Equally important is the need for regulations to be enforceable.
- *Simple:* No one wants needless complexity and everyone wants to clearly understand their rights and obligations.
- *Local implementation*: A blanket approach dictated from Whitehorse may produce hard feelings and absurd results since local conditions vary widely. (One size does not fit all.) Although a set of accepted Yukon-wide standards and approaches might be needed, they should be implemented on the advice of local Renewable Resource Councils and/or the communities.

CONCLUSION

It is pointless to insist that there are no off-road vehicle issues which concern wildlife management. There are issues because people say there are issues — and because impacts can be observed and described. How these issues are handled is a choice between a variety of approaches. Which is better will depend on the circumstances and the objectives, as well as the principles which are recognized.

Here are five approaches to off-road vehicle issues concerning wildlife management. They are presented in order of increasing regulation of off-road vehicles. In any region, these approaches can be blended, and other approaches might be devised.

- Approach 1: Do nothing.
- Approach 2: Limit wildlife harvest, but don't limit off-road vehicles.
- Approach 3: Regulate off-road vehicles to help limit wildlife harvest.
- Approach 4: Regulate use of off-road vehicles to limit wildlife disturbance and habitat damage.
- Approach 5: Consider use of off-road vehicles within the context of land use issues.

Approach 1: Do nothing

This approach will appeal to off-road vehicle owners, people who insist on hard data before making decisions, people who value simplicity and clarity, and those who feel that addressing off-road vehicle issues will raise more problems with user conflicts, enforcement, and self-government agreements than it's worth.

Doing nothing is easier, cheaper and less controversial in the short run because it is a continuation of present policies. It may be most sensible and a preferred approach in places which have few resources at risk or which have little off-road vehicle activity. In other areas, the long-term consequences of doing nothing are likely to be less desirable.

- Overharvest situations will continue to arise in specific localities such as in Granite Creek near Haines Junction, over large areas such as GMZ-7 and among the Finlayson caribou herd. Highly accessible areas like Mayo could experience both localized and widespread overharvest.
- Landscape and vegetation impacts will continue, worsen, and likely accumulate. This will contradict accepted public objectives as outlined in the Yukon Conservation Strategy, and will undermine the goals of fostering an ecotourism industry and providing lifestyle and recreational opportunities for all Yukoners.
- Conflict and dissatisfaction among backcountry users will intensify and likely lead to both civil and political issues.
- Resource managers at all levels of government will be held to account for poor stewardship.

The most important lesson from other jurisdictions is that it is too late once off-road vehicle impacts have been allowed to become serious. Recovery may take decades (or may not even be possible). Costs and consequences spiral, and public dissatisfaction is high. If managers and public leaders in places which have experienced high impacts could turn back the clock, they would try to be proactive on off-road vehicle questions. They would invest in research to provide information on impacts and on effective management.

Approach 2: Limit wildlife harvest, but don't limit off-road vehicles

If managing and maintaining game populations is the only, or main objective, this is a direct, but incomplete tool. Many off-road vehicle hunters would prefer to live with a permit system that would preserve their freedom to use their vehicles. To meet the criteria of effectiveness and fairness, First Nations would also have to participate, raising questions about allocation, enforcement, and harvest reporting. Implementing full harvest limitations would not be a simple task. Preconditions for achieving this would include widespread education of all hunters, settlement of all land claims, consultation and agreement of all First Nations and passage of legislation by First Nations to regulate their own citizens.

However, it must be said that limiting harvest would not be enough if wildlife is subjected to disturbance, stress, displacement and habitat damage. Nor would harvest limitations address the objections from non-off-road vehicle hunters and recreationists. Conflicts with non-off-road vehicle users and landscape scarring would persist.

If off-road vehicle use proliferates across the Yukon, this approach would not meet the criterion of fairness. Non-off-road vehicle hunters and recreationists would be denied their legitimate

opportunities and public lands and resources would continue to be damaged. The consequences for not addressing these issues are described in Approach 1. Approach 2 may be a useful incremental step in landscapes which do not encourage off-trail off-road vehicle travel, and in which there are few conflicts with other recreationists.

Approach 3: Regulate off-road vehicles to help limit harvest

This is a partial approach that could be effective in some situations, especially if more than one management technique is available. As can be seen in the Ruby Range of GMZ-5, regulating off-road vehicles can be done incrementally. It is not a radical departure from policy and can be applied or lifted piecemeal, as need warrants. It may be difficult to implement if First Nations consent and collaboration cannot be obtained to achieve universal application. The criterion of fairness is important to the off-road vehicle public. This approach might reduce some user-group conflicts by separating hunters using off-road vehicles from those not using them. It might also reduce some landscape impacts, but this is not likely to be a significant contribution since recreational off-road vehicles would not be affected.

There is a serious limitation to this approach. It does not address wildlife disturbance, habitat damage and conflicts with non-off-road vehicle users. One use for this approach could be to regulate or limit pressure on previously undisturbed game populations made accessible by mining or logging trails.

Approach 4: Regulate use of off-road vehicles to limit wildlife disturbance and habitat damage

This approach complements the need to regulate wildlife harvests by regulating and reducing the impacts that off-road vehicles have on the land and on wildlife behaviour. Applying measures to regulate harvests does not address all wildlife concerns. For example, hunting for moose and caribou in the Southern Lakes area is already restricted in part by regulation and in part by agreement, but recreational off-road vehicle use (especially snowmachines) is widespread in the winter ranges. Disturbance and displacement of moose and caribou in these areas by snowmachines greatly concerns wildlife managers. Providing the means to close trails or areas to all off-road vehicles, and providing the means to limit their numbers would address these problems. Managers would have greater flexibility and could apply an appropriate tool — one which regulates no more than is needed to achieve an objective — in more situations if this approach were available and could be applied universally.

Approach 5: Consider all use of off-road vehicles within the context of land use issues

Approaches 1, 2, 3, and 4 are piecemeal approaches chiefly directed at the biological problems of game management. A comprehensive approach would recognize biological, social and economic issues. It would seek to achieve agreed-upon biological objectives such as maintaining biodiversity and wildlife abundance. It would seek to achieve objectives in the conservation and use of lands and resources. It would aim to balance the legitimate interests of all parties

on the basis of consensus and compromise. If supported by legislation and regulation, a land use approach could identify and protect critical habitats, biological "hotspots," and areas of key wildlife concentrations, and manage them to prevent incompatible land uses and activities. The need for monitoring and research programs in specific areas could be identified and systematically applied.

A land use approach could provide adequate opportunities for off-road vehicle hunters and recreationists while providing adequate — but separate — opportunities for hunters and recreationists who just can't stand them. It seeks to eliminate needless off-road vehicle impacts, while trying to minimize unavoidable impacts. It attempts to evenhandedly address all activities on the land: recreation, hunting, tourism and industry. It is the most effective way to apply and coordinate wildlife management efforts with other land use activities. The need for regulations and the selection of effective and appropriate ones can best be identified through a land use approach.

By the principles of fairness and effectiveness, a comprehensive approach must apply to all members of the community. This is classically accomplished through land use planning, but it can also be achieved by other efforts such as forest management planning. The Umbrella Final Agreement requires that the means for regional land use plans and forest management plans be provided.

Summary

Each approach will be useful in some situations and have drawbacks in others. The "proper" approach to off-road vehicle impacts will vary, depending on the area and its conditions, the volume of off-road vehicle traffic, the kinds of other uses, and the values of local residents.

Approach 1 (Do nothing) is the least defensible as a general rule although it may be best in the short term in remote areas with little activity. This approach ignores the mounting evidence of off-road vehicle-connected impacts and the equity questions arising from conflicts with non-off-road vehicle users. Most seriously, it ignores the experience that other jurisdictions report, namely that most off-road vehicle impacts worsen and become more difficult to address and correct the longer they are left unattended. In view of these experiences and the evidence accumulating in the Yukon, the general application of Approach 1 should be seen as short-sighted and irresponsible.

Approach 2 (Limit wildlife harvest, but don't limit off-road vehicles) has utility and may be most appropriately used in areas which have dense networks of access trails and high harvest pressures. If supplemented where necessary by regulations to restrict off-road vehicles to existing trails, there will be little new habitat damage, little additional wildlife disturbance, and few conflicts with non-off-road vehicle users, who will have been mostly displaced from these areas already.

Approach 3 (Regulate off-road vehicles to help limit wildlife harvest) has utility for harvest management and for reducing conflicts with non-motorized hunters, but it does not address habitat and disturbance problems caused by the recreational use of off-road vehicles. In places where recreational off-road vehicle use has been minimal, this approach might be useful to limit the impact of off-road vehicles on undisturbed wildlife populations. It could also be useful for separating motorized and non-motorized hunters.

Approach 4 (Consider use of off-road vehicles within the context of land use issues) is a necessary complement to the tools already possessed by wildlife managers. The present conditions faced by the Southern Lakes caribou and moose populations cannot be addressed unless the mechanisms are developed to regulate all use of off-road vehicles (recreational and hunting) in the interests of wildlife. These same tools can serve to partially address conflicts with non-off-road vehicle users.

Approach 5 (Consider all use of off-road vehicles within the context of land use issues) is the most comprehensive and flexible. It is really a combination of all possible approaches applied to the full range of problems and issues — biological, social, and land-use issues. It would offer the greatest opportunity to resolve conflicts and to attain agreed-upon objectives. A land use planning framework will not be readily available anywhere in the Yukon. In most places in the foreseeable future, land use planning or forest management planning are likely to remain a goal to move towards and off-road vehicle issues will have to be addressed in the context of more limited objectives.

Case studies of management situations in the Yukon involving off-road vehicles are provided in the next section.

OFF-ROAD VEHICLE CASE STUDIES

There are common features to the questions raised about off-road vehicles and the management of public lands and wildlife in the Yukon. Foremost is a lack of hard data. We generally know where and when off-road vehicles are used, and we can often identify some of their impacts. But we usually do not know how many are used, how frequently, who is involved, and the significance of the impacts that are observed. It can be difficult to determine if an impact is anything to be concerned about, if it is an indicator of an emerging problem, if it contributes to a larger problem, or if it is a problem in its own right. And we do not know if there are unobserved impacts which may be important.

If the Yukon public wants greater involvement and influence in resource management, it must become accustomed to addressing issues that have incomplete or ambiguous data. For most cases concerning off-road vehicles, it is unlikely in the near term that the quality of the information and data will improve so that decisions can be made with certainty.

Another common feature is that off-road vehicle-related issues involve values in tension. A gulf in values and ethics separates off-road vehicle hunters from other backcountry users. Wheel ruts on an alpine ridge are probably inconsequential to the person making them. To others, these same ruts are desecration and vandalism to the landscape.

The case studies present a cross-section of the range of issues in which off-road vehicles play a role. The Miners Range can be seen as an opportunity to correct an emerging problem. The case involving Mayo asks how a favourable status quo can be preserved and improved. The Whitehorse South/GMZ-7 case asks how — if at all — a deteriorated situation might be retrieved. The pivotal role of First Nations should be evident in each case; so, too, should be the stake of off-road vehicle owners, non-motorized hunters and recreationists, and the general public. There are no right or wrong answers to these cases. Solutions will vary depending on how or if a problem is recognized, what objectives are selected, and the values of the people involved. The health and abundance of wildlife populations provide the final measure of the solutions chosen.

CASE 1: GMZ-550 – MINERS RANGE

The Miners Range is one of several small, isolated sheep ranges between Whitehorse and Haines Junction. Its management challenges are typical for these ranges: increasing access by off-road vehicles, increasing hunter use, increasing harvest, increasing impacts on alpine landscapes, and increasing complaints by walk-in and horseback hunters. Also typical are the nature of the management questions. What are the trends in sheep populations, hunting pressure, and resource uses and impacts? Does the current situation or do the trends warrant changes in management? If so, what would be the objectives? What would be the options?

The Miners Range rises immediately north of the Hotsprings Road and west of the Mayo Road. Pilot Mountain (6,739 feet) and Flat Mountain (6,350 feet), its two highest peaks, are clearly visible from Whitehorse, the Alaska Highway, and the Mayo Road. About 25 miles long north to south, and approximately 12 miles across from east to west, the Miners Range is separated from the nearest neighbouring sheep habitat in the Sifton Range to the west by the valleys of the Little River and the Thirty-seven Mile Creek. There is little, if any, exchange between the sheep populations in the Sifton Range and the Miners Range. The area is not within a registered guiding concession.

The alpine zone in the Miners Range begins just above 3,500 feet — about 1,000 feet above the valley floor. Once above timberline, the topography offers easy terrain to hikers, horse parties, and off-road vehicles. The uplands are wide open with broad shoulders and tablelands, accessible ridges, and gentle passes between the rounded peaks. For the last 30 years (and perhaps longer), three horse trails have provided access into the Miners Range from the east, south and west sides.

Through the late 1980s, 10 people per year, in four to five parties, regularly hunted this range with packhorses, spending between seven and 14 days at a stretch. Horses were typically used to establish a base camp and sheep hunters proceeded on foot. Beginning in 1990, parties using off-road vehicles began entering the range via the horse trail leaving

the Mayo Road. By 1995, four to five off-road vehicle and Argo parties per year had become usual. Moreover, motorized recreational use of the area has swelled. Horse and hiking access trails were overcut and widened for off-road vehicles, and snowmachine use has become frequent in the later part of the winter. Off-road vehicle access is now possible from the west side of the range and machines have approached timberline on the Flat Creek trail.

In the view of hunters who have visited the Miners Range for over 30 years, the quality of the hunting experienced has diminished since the off-road vehicles made their appearance. Off-road vehicle tracks and trails are seen on ridges, passes and in valleys throughout the alpine zone. One-day off-road vehicle hunts are now possible. Some motorized hunters push well beyond base camp. Off-road vehicles have been seen on ridges above sheep on more than one occasion. As a result, the sheep are reported to be more nervous and skittish than they were a decade ago. There is concern that sheep may be stressed by the machines, but this has not been confirmed.

Surveys done by the Department of Renewable Resources detail the gulf separating traditional non-motorized sheep hunters from those who use off-road vehicles (*Views from the mountain: What resident Yukon sheep hunters have to say*, Carey, Tousignant, 1997). Over 26% of Yukon sheep hunters would ban off-road vehicles entirely, while 39% would restrict them to designated routes and stop them below treeline. Clearly, in the view of many hunters, off-road vehicles constitute a problem which is not being addressed.

Accounting for variation in counting success, the total sheep population has been relatively stable since the first inventory in 1974. The 1995 inventory confirms this: 31 lambs per 100 nursery sheep is within the range of stable populations, as is 46 rams per 100 nursery sheep (Tables 1 and 2).

From the tables and background information, the following observations can be made.

- In the Miners Range, sheep hunting pressure and average yearly harvests have increased since the arrival of off-road vehicles in 1990. Sheep harvests throughout the Yukon were higher in the 1990s than in the previous decade, showing a general trend towards more hunting pressure.
- On average, sheep taken in the Miners Range are a year and a half younger than the Yukon average. Rams are being cropped sooner in the Miners Range than in other populations. Fewer are getting old.
- The population is isolated and has essentially no recruitment from outside. Present harvest levels are sustainable, but harvest trends are approaching capacity.
- A decade ago, hunting pressure tended to alternate years. Since the advent of off-road vehicles in 1990, it has remained high. The population has no "off" years to recover, and the margin for error is low.
- Access has improved since off-road vehicle use began and it will continue to improve as more trails are opened and become generally known. Due to their proximity to Whitehorse and ease of access, the number of sheep hunters can be expected to increase in the Miners Range, as can the number of recreational off-road vehicle and snowmachine riders.
- Landscape scarring from off-road vehicle use is occurring in the alpine zones in the Miners Range.

Year	Total	Lambs	Nursery sheep	Lambs per 100 nursery sheep	Rams	Rams per 100 nursery sheep
1974	113	19	73	26	21	29
1984	156	47	77	61	32	41
1995	143	25	81	31	37	46

Table 1. Sheep population, GMZ-550 –Miners Range.

- Dissatisfaction among non-motorized hunters and recreationists is growing. Complaints include unaesthetic hunting and recreational experience (noise, crowding); sheep behaviour changing; and landscape scarring and vegetation damage.

These observations pose the following management questions for GMZ-550.

1. In view of the pattern of high sheep harvests, and in view of the increasing access and the prospects for continued growth in hunter visitation, are there grounds for concern for sheep management?
2. What, if anything, can or should be done about landscape scarring in the alpine zone?
3. What, if anything, can be done to preserve the quality of the hunting experience for non-mechanized hunters?

CASE 2: MANAGING FOR SUSTAINABILITY IN MAYO

In some respects, the Mayo district can be considered a success story in moose management. According to Renewable Resources data, moose densities are lower in the Mayo area than in other parts of the Yukon, but they are similar to the territorial average and are thought to be stable or increasing slightly. Predator densities are also similar to the Yukon average. Since 1980, reported harvests have been stable, with a slightly increasing trend. Compared with the population declines experienced in the Aishihik and Whitehorse areas, there are few pressing problems with wildlife management in Mayo. The residents want to keep it that way.

Much of Mayo is a long-established mining district with a 70-year history of mineral exploration and

Hunter effort and sheep harvest, GMZ-550					Yukon-wide sheep harvest		
Year	No. licenced resident hunters	Sheep harvest	Average age	Average horn length	Total harvest	Average age	Average horn length
1980	11	3	6	31.3	67	8.3	34.7
1981	2				68	8.2	35.7
1982	13	4	6.5	34.9	89	8	34.8
1983	10	1	6	34.8	72	7.8	34.5
1984	4	4	5.3	33.3	74	7.7	34.4
1985	9	3	7	32.9	78	8.2	34.5
1986	13				71	8.3	35.2
1987	6	1	7	32.6	87	8.5	35.4
1988	11	2	8.5	34.3	91	8.6	35.2
1989	6	6	7.8	36.1	87	8.8	35.2
1990	17	7	8.1	37.8	99	8.8	36.5
1991	13	3	6.7	35.3	80	8.5	36.1
1992	13	7	6.6	35.5	86	8.3	35.2
1993	5	3	10.3	34.7	86	8.3	35.4
1994	11	5	8.8	37.1	85	8.2	36.5
1995	16	8	7.9	36.7	80	8.2	36.3
1996	14	3	7.3	36.9	79	8.7	36.8
1997	15	5	9.0	35.8	86	8.7	36.6
Total average age Miners Range			7.4		Yukon total average age		8.8

Table 2. Hunter effort and sheep harvest, GMZ-550 – Miners Range.

development. One legacy of this past is a dense network of roads and cat trails north of the Stewart River providing access through every kind of terrain and habitat, from river bottoms to alpine summits. Like Dawson, Mayo is one of the most accessible landscapes in the Yukon.

Before the use of off-road vehicles became widespread, most moose hunting in the Mayo area was from navigable waterways and roads useable by 4-wheel drive trucks. Some people hunted more remote areas by horseback; others used snowmachines later in the winter. Only a portion of the mining exploration routes were drivable; many had become overgrown or washed-out.

With the closing of the United Keno Hill mine at Elsa in late 1989, the area population dropped by some 150 potential license holders, and harvest allocation among area residents was not an issue. For the subzones bordering the Silver Trail and its road network (GMZs 401, 404, 405, 257, 258, 262, 263), the effect of the mine closure on area harvests might be inferred by the 1992 reported harvest figures. Licensed residents took 29.57 moose, a decline of 33% from 1991. On the other hand, the fall of 1992 had terrible weather and reports were down across the Yukon. (This illustrates one of the problems with interpreting harvest data.)

In the following year, the reported harvest for the same area jumped by 88% to 38.4 (Table 3). Some variation in harvest is normal, but a general trend appears evident in the subsequent five years. The harvest has remained high, especially compared with an 18-year low of 11.45 in 1987.

It is difficult to explain everything about the rising harvest with certainty, but there is information that supports a partial explanation. Beginning in the early 1990s, the use of off-road vehicles in the Mayo area became more widespread. It appears that the use began slowly and has been growing each year. Hunters from elsewhere in the Yukon — chiefly Whitehorse — have more than compensated for the exodus from Elsa.

Year	Moose harvest
1992	20.53
1993	38.41
1994	33.24
1995	37
1996	29
1997	46

Table 3. Reported moose harvest, Silver Trail subzones.

Several factors have contributed to the increase in ATV use. Formerly disused cat trails have been reopened and explored by hunters; the reputation of Mayo as an area accessible to off-road vehicles has grown; and the number of owners of off-road vehicles has grown in Mayo and throughout the Yukon.

There are mixed views on the effects of widespread off-road vehicle use in moose hunting. Before off-road vehicles, most moose hunting was confined to within about a kilometre (the upper limit of the distance one might pack meat) of passable roads, navigable waterways, and fly-in lakes. Although these zones may have been harvested heavily (Ethel Lake yielded 12 "licensed" moose in 1982), they could be replenished by adjacent unhunted moose populations.

The 1993 moose survey in Mayo reported that 56% of moose observed were on 17% of the sample units. Moreover, 34% of the moose observed were in the subalpine zone between 1,070 and 1,525 metres (3,500 to 5,000 feet). Areas burned in the last 20 years were most productive. Boat hunters and most road hunters have little access to these productive subalpine areas in Mayo, but off-road vehicles provide ample access.

The harvest data for the Silver Trail corridor shows that from 1979 to 1991, Ethel Lake and Keno consistently provided the bulk of the harvest. Both zones had large accessible lakes adjacent to subalpine zones, and Keno had 4x4 roads into the subalpine. With the several hundred kilometres of trails accessible to off-road vehicles in the Mayo area, the moose harvest has unquestionably been dispersed since 1991. Ethel Lake remains important — perhaps in part because of a newly developing off-road vehicle trail network into the ridge north of the lake. By comparison, Keno and the Janet Lake subzone have risen in significance. Both areas have widespread and expanding off-road vehicle trail systems. Subzones with little off-road vehicle access retain harvest figures similar to those of the early 1980s.

It is common to think that spreading the harvest with off-road vehicles is good moose management. If total

harvest pressure remains fairly constant, this view is defensible — more populations are affected, but less intensely. There are hazards to this assumption, however. The model fails if any of the following occur to produce excessive mortality.

- There is a net increase in hunting pressure.
- Off-road vehicles increase hunting success rates.
- Large numbers of off-road vehicles or snowmachines access key concentrations (rutting, post-rut, or late winter).
- Key concentrations are disturbed and displaced.

The 1993 moose census reported that populations in the Mayo area had remained stable or slightly increased since the previous census in 1988. Moreover, the proportion of mature bulls in the population had remained stable as well, indicating a sustainable harvest. Predator levels were within normal averages. The report mentioned that "the local perception that there has been an influx of outside hunters" was not supported by data showing that licensed resident hunting pressure had declined in the period 1988 to 1993.

Despite these apparently reassuring statistics, people in Mayo are uneasy. They know, as the 1993 census report points out, that it is not possible to accurately assess the status and trend of a moose population on the basis of a single year's recruitment data. A census is just a snapshot. What if it is inaccurate? What if a new trend has been shaping up in the last five years? The harvest data for the Silver Trail corridor may show a trend: the five-year average for moose killed by licensed hunters since the 1993 census is 37 per year, compared with 24 per year in the period between the 1988 and 1993 censuses.

Both biologists and elders are concerned about the harvest levels at Ethel Lake and McQuesten Lake. They have been high for five years — higher than can be sustained by the local populations. Recruitment has been coming from adjacent areas, but how many can be supplied and how long can this go on? What if these recruitment areas get hunted hard? What if the hunting pressure doubles?

No one has counted, but people in Mayo think that lots of hunters are coming into the area from outside, and that the number is increasing as opportunities shrink in the Whitehorse area. The trucks hauling off-road vehicles are conspicuous in Mayo and on the Silver Trail. They are even more conspicuous parked at a trailhead where a local wants to hunt. Even though the area is big and the trail network is extensive, local people feel crowded; they encounter outside parties too often. Their perception is that the stress, noise, and commotion of outsiders on off-road vehicles have diminished the enjoyment and satisfaction of local people in their home area. People don't mind sharing moose, but they don't want to share too many and they don't want to drift into a population crash.

There are other concerns. So far, damage to vegetation and soils has been limited. Since there are so many trails to so many places, there is little reason to go off the tracks already established by bulldozers. On the other hand, there are indications that enterprising off-road vehicle riders are willing to extend the trails into untouched places. Caribou hunters in the Clear Creek area have already been doing this for a few years. The miners have been hard on the country, but they at least need permits to build trails and can be monitored. People in Mayo don't like the idea of having access pushed into their remaining remote places willy nilly. What if trails open up into some key concentrating areas? At certain times of the year, the majority of moose in the Mayo area concentrate in a few specific high-quality habitats. Trail access to these spots could be devastating. Fire control trails or new mining trails might do this, and so could some determined off-road vehicle enthusiasts.

Perhaps because so much of the area was cut up by mining trails, people in Mayo place high value on what remains. At one time, a miner could get equipment into claims on a winter trail and the area would still be inaccessible to others. Now, the combined capabilities of quads, Argos, and snowmachines make any mining trail into a permanent year-round route. Williamson Lake is an unhappy case in point for local people. Only 18 miles from Mayo, Williamson Lake was overlooked by outside hunters and was a "backyard wilderness" for locals. A short flight away, it was a reliable moose and caribou area which could be hunted in the old way — a boat on the lake, or by foot on the hills. In 1995, an application was filed for a winter access trail to a placer claim. Local opposition was high. The access could not be denied, but permit authorities stipulated that the trail should be minimal and that

the cat should walk in with the blade up. Local people believe that the trail was "improved" more than was necessary or authorized. Regardless of how it occurred, the resulting trail is well within the capabilities of off-road vehicles and the Williamson Lake area is now accessed and hunted using these vehicles. The Renewable Resource Council wonders if it is too late for Williamson Lake; must it be written off as a remote site?

People in the Mayo area feel troubled and vulnerable to changes they cannot presently influence. As with many resource management questions in the Yukon, information and data are scarce and ambiguous, making it difficult for residents to summarize and substantiate their concerns. But it is clear that they feel vulnerable to a hidden problem and they know that hunters on off-road vehicles are somehow related to it. How can Mayo sustain adequate moose populations, and how can local residents maintain the quality — for some, the spirituality — of what untouched backcountry remains in their area?

Locals know that Mayo can't be locked up and made off-limits to Whitehorse hunters, and they know that off-road vehicles are not "the problem." After all, local people use them too; an estimated 30 off-road vehicles are owned by Silver Trail residents. On the other hand, if local people want to sustain a moose population, preserve a quality of outdoor experience, and preserve remaining backcountry, they must ask themselves the following questions.

- What might happen if double or triple the number of outside hunters with off-road vehicles come to Mayo next year?
- What might happen if double or triple the number of Silver Trail residents and First Nation hunters buy off-road vehicles?
- What might happen if new access is created to untouched habitats and/or favourite areas?
- What might happen if access is created to areas of key moose (or caribou) concentrations?

Any or all of this could happen, and in certain combinations of circumstances produce unwanted and long-term changes in the Mayo area. As the saying goes, an ounce of prevention is worth a pound of cure. Is an ounce or two of prevention warranted in the Mayo area?

CASE 3: RESTORING MOOSE IN GMZ-7 – WHITEHORSE SOUTH

Game Management Zone 7 is in the southwest Yukon, bounded by the Haines Road, the Alaska Highway, and the Carcross Road. It is ringed by settlement. Beginning at Dezadeash Lake, cabins and homesites dot the encircling highways. The open spaces between Haines Junction, Canyon, Champagne, Mendenhall, Takhini Crossing, Whitehorse, Robinson, and Carcross shrink yearly as farmland is cleared. About 28,000 people — 93% of the Yukon's population — live near GMZ-7. Most are in the Whitehorse-Southern Lakes areas.

Dezadeash Lake, Dezadeash River, Kusawa Lake, Fish Lake, and Bennett Lake provide water access deep into GMZ-7 on the west, north, and east. Elsewhere, roads, cat trails, and horse trails enter from each of the highway corridors. Biologists consider GMZ-7 to have an abundance of high-quality moose habitat. Twenty years ago, concentrations of up to 100 moose were observed during aerial inventories, and harvests by licensed residents were over 100 per year. Yet today, such large concentrations are a thing of the past and permits are issued for only 10 bulls per year. Moose populations are not all that have declined. The Ibex caribou herd, itself perhaps a remnant of the once great Fortymile caribou herd, has dwindled to barely viable numbers.

If the wildlife populations of GMZ-7 are to be restored, the causes for their decline must be understood before they can be corrected. It is simplistic to observe that game populations decline when mortality exceeds recruitment. Causes of excessive mortality can be any or a combination of habitat loss or displacement, disturbance at critical times, excessive predation, excessive hunting disease or starvation.

Determining which factors come to bear on a given area is often not easy. Information and data are usually scanty, and mortality causes can combine in subtle ways. Variations and trends in bull to cow ratios, calf to cow ratios, calf survival rates and total population figures may be caused by any number of factors. In the case of GMZ-7, disease, starvation and habitat loss are not considered to be significant. Attention is naturally drawn to predation, hunting, and — possibly — disturbance.

Predation in the southwest Yukon has been extensively studied by the Department of Renewable

Resources since the early 1980s, but information on harvest is incomplete. Accurate figures on hunting effort and harvest by non-residents and by licensed residents exist, but little is known about the hunting patterns and harvest success of the four First Nations known to hunt in GMZ-7. In the absence of harvest figures, a common "informed estimate" is that the First Nation harvest in open hunting areas at least equals the licensed harvest.

In the eastern sections of GMZ-7, between Whitehorse and Kusawa and north of the Watson River —those areas adjacent to the highest population centres — licensed moose hunting is under a strict permit system. In this area, the method of estimating First Nation harvest is even less valid. Even so, this part of GMZ-7, referred to as "Whitehorse South" by departmental moose inventories, is the best studied and offers the best available information. Since it also receives the most pressure from nearby Whitehorse and its suburbs, it is a good focus for attention.

Whitehorse South includes Game Management Subzones 7-13 to 7-27 and about 2,500 square kilometres of habitable moose range. This is an area of high, steep-sided mountains up to 7,000 feet, separated by U-shaped valleys and broad, open tablelands and gentle passes. Treeline occurs between 3,500 and 4,000 feet, and above this is an extensive subalpine zone of willow and dwarf birch to 5,000 feet. This area contains high quality moose habitat. In the recollections of local people, it had abundant moose in the 1950s, 1960s, and 1970s.

In response to local concerns about abundance, moose surveys were conducted in 1981, 1982, 1983, 1986 and 1995 (see Table 4). Licensed hunters began hunting elsewhere starting in 1983. The number of days of licensed hunting effort dropped from 2,338 days in 1982, to 1,512 days in 1983, to 819 days in 1984, to 412 days in 1986 (see Figure 1). By 1986, the reduction of licensed hunting effort and a partial wolf

POPULATION CHARACTERISTICS	1981[1]	1982[1]	1983[2]	1986[2]	1995[3]
Estimated abundance (90% C.I.)					
total moose	608 (497-720)	674 (436-912)	654 (508-801)	715 (573-858)	447 (379-515)
density (moose/1,000 km²)	218	252	245	283	155
Estimated composition (90% C.I.)					
adult bulls (>30 months)	107 (70-143)	139 (79-199)	154 (104-204)	111 (83-138)	114 (84-143)
adult cows (>30 months)	344 (271-417)	409 (280-537)	373 (280-466)	406 (302-510)	196 (155-237)
yearlings (>18 months)	86 (52-119)	27 (0-56)	16	75 (55-94)	55 (30-79)
calves (<7 months)	72 (51-94)	100 (58-143)	111 (53-170)	124 (97-152)	82 (65-99)
Estimated population ratios (90% C.I.)					
adult bulls/100 adult cows	31 (23-39)	34 (25-43)	41 (24-59)	27 (22-32)	58 (45-71)
yearlings/100 adult cows	25 (14-36)	6 (1-12)	4 (3-5)	18 (12-25)	28 (12-43)
calves/100 adult cows	21 (15-27)	25 (18-31)	30 (19-41)	31 (23-38)	42 (32-51)
% adult bulls in total population	18 (13-22)	21 (16-25)	24 (15-32)	15 (13-18)	25 (21-30)
% adult cows in total population	56 (52-61)	61 (55-66)	57 (51-63)	57 (52-61)	44 (39-49)
% yearlings in total population	14 (9-19)	4 (1-7)	2 (2-3)	10 (7-14)	12 (7-18)
% calves in total population	12 (9-15)	15 (11-19)	17 (11-23)	17 (14-21)	18 (15-21)
Observed composition[4]					
adult bulls (>30 months)	68	66	92	73	61
adult cows (>30 months)	191	183	240	248	110
yearlings (>18 months)	42	8	16	56	24
calves (<7 months)	28	28	45	75	43
total	329	285	393	452	238
Observed ratios[4]					
adult bulls/100 adult cows	36	36	38	29	55
yearlings/100 adult cows	22	4	7	23	22
calves/100 adult cows	15	15	19	30	39
% adult bulls in total population	21	23	23	16	26
% adult cows in total population	58	64	61	55	46
% yearlings in total population	13	3	4	12	
% calves in total population	8	10	11	17	18
twinning rate[5]	n/a	n/a	n/a	n/a	8%

Table 4. Summary of Whitehorse South area moose population results and survey characteristics from early winter 1981, 1982, 1983, 1986 and 1995. (Note: a sightability correction factor has not been incorporated.)

control program appeared to be paying off. Moose populations rose from 595 in 1981 to 717 in 1986.

By 1995, a significant decline was evident. The inventory showed just 431 moose, even though licensed hunting had been below 90 days per year since 1989, and was just 60 days in 1994. The mean annual licensed harvest declined from 39 moose per year (1982-1986) to 2.5 moose per year (1991-1995).

Since licensed moose hunting was a negligible cause of mortality in the Whitehorse South area, the other causes to consider are predation, First Nation hunting, disturbance and starvation. As established by Larsen (*Causes and rates of moose mortality in the southwest Yukon, 1989*) predation is the greatest single factor in controlling moose numbers. Less than 25% of moose calves survive their first year, mostly because of predation by bears and wolves. For the surviving population of adults and yearlings, the leading cause of mortality is predation (10 to 20% per year). Predation is accepted as "natural." It is thought to be excessive only if it is responsible for producing and retaining abnormally low population levels.

Since predation falls heaviest on calves, one index of excessive predation is a low ratio of cows to calves. This same ratio is an indicator of disturbance during breeding or calving as a limiting factor. The 1995 survey showed that the calf to cow ratio actually improved from 31 calves per 100 mature cows in 1986 to 46 calves per 100 mature cows in 1995. It is unlikely that predation had been the cause of the decline, unless in 1995 there was uncharacteristically high recruitment. The 1995 ratio indicates an increasing population.

The ratio of mature bulls to mature cows also increased between 1986 and 1995. In 1986, there were 27 bulls per 100 cows — below the 30 bulls per 100 cows needed to ensure that all mature cows are bred. In 1995, the ratio improved to 56 bulls per 100 mature cows, a ratio normally indicative of an improving population and declining hunting pressure on the bulls. But since population levels in fact fell, perhaps the ratio changed not because of less bulls taken, but because more cows were shot.

Sustainable harvests should be within 4% of the fall pre-hunt population. In 1986, the moose density for

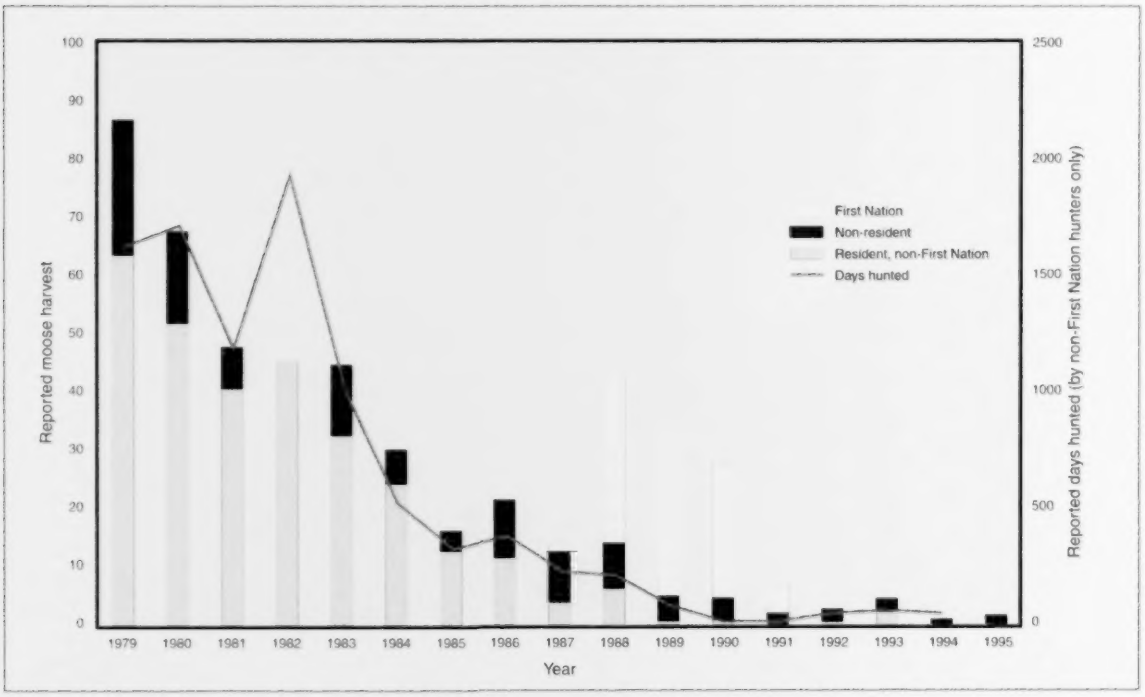

Figure 1. Reported annual moose harvest and days hunted in the 1995 Whitehorse South moose survey area (GMS 7-13 to 7-27, 731).

Whitehorse South was calculated to be 284 moose per 1,000 square kilometres. A sustainable harvest based on this density was estimated to be 30 moose per year. Based on the 1995 moose density of 147 moose per 1,000 square kilometres, a new sustainable harvest estimate would be about 17 moose per year.

Assuming that the 1986 and 1995 censuses were accurate, that the predation levels have been within normal ranges, and that there were no severe winters, it is reasonable to ask whether First Nation harvest has been exceeding the sustainable level. The only available First Nation harvest data was collected between 1988 and 1990 from only some of the First Nations. The reported average was 25 moose per year. Added to all other reports, the total reported harvest average for Whitehorse South for this period was 33.5 moose per year, above the estimated sustainable harvest. The additional harvest from the other First Nations is unknown.

It is possible that the First Nations hunting effort has remained the same, but that its success rates may have increased because of changes in access. In the early 1980s, fall hunting occurred from the few big lakes, from mining exploration roads, by horseback, and from fly-in lakes. Snowmachines tended to follow much the same routes. In the late 1980s, the design, power, range, reliability and capability of off-road vehicles and snowmachines improved dramatically.

As sales of off-road vehicles and snowmachines in Whitehorse began to climb so did their recreational use in the mountains behind Whitehorse. The effect was evident in the Whitehorse South landscape. Horse trails widened into off-road vehicle trails, routes inaccessible to 4x4s became commonplace for off-road vehicles, and the trail network expanded through subalpine areas and frequently into the alpine. New snowmachines could handle deeper snow and thicker scrub, and riders were less exposed to breakdowns. Areas once accessible only by a lengthy packhorse trip could be reached in a few hours, and good moose hunting could be done as a day-trip from home, fall or winter.

The link between declining moose populations and access for off-road vehicles and snowmachines can easily be seen. According to the 1995 census, while moose numbers have declined dramatically around Fish Lake, Rose Creek and Alligator Lake (areas now easily accessible and frequently visited), numbers in more remote areas have remained at or near historic levels. Access routes in the Whitehorse South block go through places where high-quality moose browse. Some routes penetrate sites where large post-rut moose aggregations used to occur but no longer do. Whether these sites have become abandoned because of hunting or because of disturbance by recreational riding, or both, is not clear. What is clear is the correlation between the use of off-road vehicle access routes and depopulated moose habitats.

The access routes into the mountains west of Whitehorse are now facts. Also a fact is the existence of large numbers of capable off-road vehicles and snowmachines in nearby communities. How these off-road vehicles are used on these access routes bears on the prospects for the recovery of big game in the area. Will voluntary measures be sufficient?

APPENDIX 1: 1997 STUDY

Locks, David, 1997. Off-road vehicle use in the Yukon: Issues scoping study for Yukon Department of Renewable Resources. TransNorthern Consulting Ltd., Whitehorse, Yukon.

It is well known that the use of off-road vehicles can cause problems with wildlife and can damage other resources. This is documented in many places and instances have been reported in the Yukon. It is also known that off-road vehicles are enjoyed by many people and that they provide practical and recreational benefits. Do the concerns associated with off-road vehicle use in the Yukon merit further attention by government? This question has not been addressed and is the topic of this report.

The report which follows is an analysis paper, not a background research paper. It is based on a large, well-developed body of information which has been discussed in detail by several writers. It is also based on a limited body of original research. This report will present an overview of the research: the intent in these pages is to extract its meaning in support of public decision-making.

This study was commissioned by the Fish and Wildlife Branch of the Yukon Department of Renewable Resources. It examines the issues stemming from the use of off-road vehicles in the Yukon, with the aim of assessing the need, if any, to regulate their use. The public interest in this matter is to:

- protect fish, wildlife, and their habitats;
- maintain intact ecosystems for intrinsic and economic value; and,
- preserve opportunities for access to wilderness and wildlife by all user groups.

In this study, off-road vehicles means motorized vehicles which permit overland travel where a conventional 2-wheel drive vehicle cannot go. This study considers 4x4 trucks, dirt bikes, 3 and 4-wheelers, argos, tracked vehicles, snowmachines and hovercraft. It does not include heavy equipment, jet boats or conventional motor boats.

BACKGROUND TO THIS STUDY

The Government of the Yukon has a responsibility to protect fish, wildlife and their habitats under the Yukon Act and the Wildlife Act , and to conserve the natural environment in accordance with the public trust under the Environment Act. The Yukon Fish & Wildlife Management Board and the Renewable Resource Councils have significant responsibilities as set out in Yukon First Nation Final Agreements.

Concerns have been raised with government and with the Yukon Fish & Wildlife Management Board for much of its existence about impacts of off-road vehicle use on the environment, on wildlife, and on other users. As off-road vehicle use increases, concerns about impacts increase, and it becomes more difficult to implement management measures, if these are needed. The experience of other provinces and states in western North America has demonstrated that off-road vehicle issues can reach a critical stage quickly and can cause impacts costly or even impossible to reverse. One view is that the Yukon or parts of it might soon experience this. An opposite view is that the population of the Yukon is so small and its land base is so large that comparisons with other jurisdictions are invalid and that serious impacts are unlikely.

It has been clear to resource managers in the Yukon that off-road vehicles use has caused serious impacts elsewhere. It is also clear that off-road vehicles are part of the lifestyle of many Yukoners. It is not so certain that off-road vehicle use in the Yukon has caused serious impacts or is likely to cause them. In view of this, the Department of Renewable Resources thought it best to determine if this topic was significant before it considered what measures, if any, were appropriate.

STUDY PURPOSE

The purpose of this study was to provide information and recommendations to the Department of Renewable Resources concerning the advisability of addressing problems associated with off-road vehicle use. The objectives of the study were to:

- compare policies and legislation from other selected jurisdictions with those in the Yukon;
- discuss salient issues, problems, and opportunities concerning off-road vehicle use in the Yukon, and estimate the extent, location, and significance of the problems identified; and
- analyze whether problems associated with off-road vehicle use should be further addressed by government, considering risks over the medium and long-term of no action, and taking into account the experiences of the other jurisdictions studied in this project.

STUDY METHODS

The methods flowed directly from the objectives. The research involved information gathering and analysis. Information was gathered in the following steps.

- A review of research and popular literature concerning off-road vehicle issues, problems, and user patterns in western North America and Scandinavia,
- A review of issues, policies and legislation of the Yukon, Alaska, Alberta, British Columbia, and Newfoundland, and interviews with public officials knowledgeable about these issues in these jurisdictions.
- Interviews and/or questionnaire contact with land and resource managers, biologists and selected resource users in the Yukon. To obtain informed views from each region, questionnaires were sent to all resource management officers, conservation officers and regional biologists. Each of the four Renewable Resource Councils was contacted as well.
- Analysis of the information obtained was framed around the core question, "Should problems associated with off-road vehicle use in the Yukon he further addressed by government?"

LIMITATIONS TO RESEARCH

The study had to take into account three constraints: the sensitivity of the subject, the limited time available for the study, and the inability to conduct field research.

Sensitivity constraints. The possibility of managing off-road vehicle use is likely to be controversial. Efforts to manage snowmachine use in the Chilkoot National Historic Park and in support of the Southern Lakes – Carcross Caribou Recovery Program show there is good reason for this concern. It was agreed that this should not become prematurely elevated into a public controversy, since the outcome of this study would not result in a decision to manage off-road vehicle use. If the government decided to consider further steps, it would initiate a process of broad-based consultations to gain consensus on what should be done. For the purposes of this study, an understanding of impacts and issues could be gained without contacting all affected parties.

Constraints to time and availability. This study was to be completed in two months. It depended largely upon the availability of people across the Yukon and in each of the jurisdictions studied for interviews and for them to send reports and literature. Not all were available during this two-month period.

Inability to conduct field research. Limits to time and budget did not permit field research. Information on the locations, types and significance of impacts was anecdotal, and was added to the personal field experience of the author. The contact list was restricted to people who could reliably report from first-hand observations.

Despite these constraints, the information gathered is sufficient for drawing conclusions. The following report summarizes over 1,000 pages of literature review, 40 hours of interviews, and 25 surveys from across the Yukon.

SUMMARY OF FINDINGS AND ANALYSIS

KEY FINDINGS

- Off-road vehicle use in the Yukon exhibits the same types of impacts and problems which have been observed and documented elsewhere, namely:
  - damage to soil and vegetation,
  - stressed, displaced, and/or killed wildlife,
  - conflicts with other backcountry users,
  - uncontrolled spread of trail networks.
- The significance or severity of these impacts in the Yukon is largely unknown because systematic monitoring and research is absent. Anecdotal evidence is that some instances of serious impacts exist.
- Use of off-road vehicles in the Yukon is increasing, and impacts are spreading and becoming more frequent.
- In other jurisdictions, attempts to manage off-road vehicle use have been introduced when impacts and conflicts have reached crisis proportions. At these levels, damage to soils, vegetation and wildlife can be difficult, costly, or even impossible to repair, while conflicts with other users can be bitter, divisive and can even involve compensation.
- Off-road vehicle use is an accepted fact of life in the Yukon and is enjoyed by a significant number of Yukoners. There are an estimated 3,000 to 4,000 all-terrain vehicles and approximately 9,000 to 10,000 snowmachines. This number is likely to grow, as this activity provides legitimate benefits, and is affordable for many. Experience elsewhere shows that growth of this sport can occur rapidly.
- Off-road vehicle impacts can be successfully mitigated to the general satisfaction of society and of most users. A variety of tools have been tested and co-ordinated approaches have proved successful.
- Resource development policy and practices are responsible for the proliferation of access roads and trails into the backcountry. Access management is beyond the scope of this paper and beyond the means of the Yukon government at this time. Managing the use of off-road vehicles for hunting purposes is within the scope of the Yukon government under the Wildlife Act, but at this time, the Yukon's ability to manage the recreational use of off-road vehicles would be awkward and roundabout, at best. In the near future, the devolution to the Yukon of federal authorities over land, forests, and water will provide the Yukon with the means to regulate off-road vehicles as well as other backcountry activities to protect environmental values and recreational experiences.

SUMMARY OF ANALYSIS

The following summarizes the analysis of the findings. They are presented as a sequence of connected statements.

1. Off-road vehicle impacts are an important public topic because they bear directly on accepted public values and principles of equity, stewardship, and conservation as expressed in the Yukon Conservation Strategy and elsewhere. The full scope of off-road vehicle impacts goes beyond the topics of wildlife management and hunting regulations, and into the area of integrated resource management.
2. Impacts are occurring in the Yukon. Although the seriousness of these impacts is largely unknown, it is clear from the research in this project that there is cause for concern in most areas of the Yukon. The literature shows that some impacts accumulate over time, while others can occur rapidly, with dramatic and devastating effects. Public managers should expect that the Yukon will parallel the experiences of other jurisdictions in experiencing these effects, if no action is taken.
3. Other jurisdictions show that off-road vehicle use can be a legitimate backcountry activity causing acceptable levels of impacts, if proper management practices are applied. The array of management tools is highly flexible and has been shown to be accepted by off-road vehicle users and the rest of the public. The elements of effective and socially accepted off-road vehicle management are:

- the authority to set effective regulations;
- the information base on which to base and apply regulations;
- a policy framework which permits local communities and affected parties to participate in setting specific management actions in support of broadly accepted goals; and
- an effective public education program to encourage responsible and low-impact off-road vehicle use so that management tools may be applied sparingly.

4. The risk of no action is that significant impacts in the Yukon are likely to occur (if they have not already), and can occur with little advance notice.. These may affect an accessible wildlife population, the scenic integrity of a landscape, and/or the values of other backcountry users. Public managers and elected officials may be held accountable for serious occurrences. The likelihood of serious problems occurring in the medium term depends on the use patterns of off-road vehicle users and/or the use patterns of recreational or tourism groups which may perceive conflict. We know that all three groups are expanding in numbers and in their range of activities, and we know that some kinds of impacts become serious incrementally. The likelihood of serious problems in the long term are high, according to the literature.

5. Since further impacts can be expected and the consequences of these impacts may be serious, Yukon resource managers should consider selecting and applying some of the effective and acceptable off-road vehicle management approaches which have been developed and used elsewhere.

6. The Yukon has legislative power under the Wildlife Act to regulate off-road vehicle uses relating to hunting, but not for other purposes. In some situations, wildlife management goals can directly benefit from this. These same measures can indirectly benefit other environmental goals such as landscape conservation and wilderness management. Although this would be only a partial remedy to the full range of off-road vehicle impacts, it is potentially significant. Most ATV use in sensitive backcountry areas occurs during August and September hunting. The Yukon also has the authority under the Highways Act to close roads and trails. This is a powerful tool which can be highly effective but should be applied for carefully researched reasons. The Environment Act does not appear to be an effective base for addressing off-road vehicle issues at this time.

7. Any attempt to determine appropriate off-road vehicle management practices will require a process of educating the public and involving public interest groups. The process should seek general understanding of the nature and significance of the problems, principles which should guide solutions, the kind of approaches and measures which are workable, and criteria for how these measures should be applied in any situation.

8. Land use planning institutions may be the best way to apply off-road vehicle management practices, but they are not essential. Adequate alternative bodies such as Renewable Resource Councils exist or can be called into being to address this topic.

OFF-ROAD VEHICLE MANAGEMENT APPROACHES AND TECHNIQUES

Management agencies use various techniques to regulate off-road vehicle use depending on the problems faced, on the objectives of the agency, and on the authority provided by legislation. The major approaches are identified in the following list.

- full area closures;
- partial or seasonal area closures;
- permanent or seasonal trail closures;
- designated off-road vehicle trails;
- prohibitions on off-road vehicle travel off designated routes;
- off-road vehicle permits or limits on numbers, party size, or traffic volumes;
- trail or use restrictions;
- time-sharing of trails or areas; and
- hardening of trails, mitigation or reclamation of damages.

A SUMMARY OF OFF-ROAD VEHICLE ISSUES

OFF-ROAD VEHICLE USE IS GROWING, AND SO ARE ALL OTHER BACKCOUNTRY ACTIVITIES

In one form or another off-road vehicles have been around for some 50 years. Surplus military 4x4s became widely available soon after World War II, and Argos, Coots, and other all-terrain vehicles followed in the 1960s, about the same time as snowmachines and high-compression dirt-bikes. The market jumped in the 1970s when Japanese manufacturers developed the 3-wheel and later the 4-wheel ATV.

Although impacts from the use of off-road vehicles have been widely noted since the early 1970s, concerns from land managers, wildlife officials, conservation groups and non-motorized recreationists have escalated in North America in recent years. The reason is that modern ATVs are technologically far superior to the machines of 10 years ago. Today's 4-wheel and 6-wheel drive ATVs have much greater ability to climb steep slopes, push through heavy vegetation, and ford deep streams. Larger, multi-passenger models have even greater traction, power, and load capacity; several are fully amphibious. All modern ATVs and snowmachines have significantly improved reliability and low maintenance. With a compact design, ATVs and snowmachines can be loaded into single engine aircraft, onto motorboats, and into the back of pickups and transported to distant locations. The result is that few places on the continent are inaccessible to these vehicles. Further, as the ATV market is highly competitive, manufacturers are constantly striving for improvements in technology, reliability, and affordability. At prices ranging from $3,500 to $10,000, ATVs and snowmachines are within the reach of most rural dwellers as well as urban enthusiasts.

While the number of off-road vehicles and the areas affected by them have increased, other activities in the backcountry have increased too. Non-motorized recreation has grown steadily. This includes cross-country skiers, ski mountaineers, snowboarders and snowshoers in the winter, hikers, mountain bikers, backpackers, rafters, canoers, kayakers, horse-packers, and walk-in hunters in the summer. Facilities and properties owned or operated by tourism businesses, outfitters, trappers and vacation cabin owners have also increased. In sum, the backcountry is more crowded than ever, and every one hopes to see wildlife, enjoy a "pristine" environment, and not meet, hear, or see traces of anyone else. With growing impacts by all users has come a demand from some that "no-trace" and "minimum impact" ethics be followed by all. The Yukon is by no means as crowded as other places, but these same trends can be observed.

IMPACTS CAUSED BY OFF-ROAD VEHICLES

A thorough review of the literature revealed few, if any, scientific studies where off-road vehicles were operated without adverse impacts. The key question is how significant are these impacts? There is no easy answer to this. It depends on the volume of use in any time period, when the use occurs, the sensitivity of the terrain, who is observing the impacts, and the relative value placed on the resources affected.

Off-road vehicle use causes four kinds of impacts:

- damaged soils and vegetation;
- stressed, displaced, and/or killed wildlife;
- conflicts with other backcountry users;
- proliferation of trail networks.

In Alaska, off-road vehicle use tends to follow a pattern. New resource roads and trails are quickly used by off-road vehicles as jump-offs for trails to areas still further afield. Initially, pressure from use is dispersed, but a cycle of increasing pressure followed by an expanding off-road vehicle trail network occurs. In the interior, there are practically no limitations of terrain and range. A comparable pattern may be observed in the Yukon wherever there is a mineral exploration district.

Impacts to soils and vegetation

Research in Alaska, northern Canada, and Scandinavia has documented the impacts of off-road vehicles on wet and dry tundra, wetlands, bogs, buck-brush, meadows, and various types of forest cover. Although the amount of damage varied between different types of vehicles and test conditions, the results were essentially the same: repeated passes of

off-road vehicles destroy first the vegetation, and then the structure of the soil. In fragile areas, even a single pass of an off-road vehicle can leave a track visible for several years.

The severity of off-road vehicle impacts depends on many factors, including slope, road relief, soil type, permafrost, soil moisture, vegetation, season, temperature, vehicle type and weight, traffic, and the skill and attitude of the operator.

Below are listed some effects of summer traffic.

- Ice-rich soils are most vulnerable to damage and to long-lasting scarring as the organic material is sheared and subsidence occurs.
- Trails through wetlands and bogs quickly become quagmires which spread laterally as off-road vehicle users attempt to avoid the muddy sections.
- Alpine soils, especially those with brittle lichen, crush easily and can take up to 10 years to rebound after only light traffic. Trails remain visible for decades.
- Willow, dwarf birch, and Labrador tea stems were moderately damaged after five passes of a small off-road vehicle. On sharp turns, fewer passes produced severe damage.
- The lichen understory of white and black spruce stands is destroyed after even single passes of an off-road vehicle.
- Sedge tussocks receive up to four times the calculated ground pressure of an off-road vehicle tire and are easily torn, abraded, and collapsed.
- Soils are first compressed, then exposed as vegetation is stripped, and finally rutted and eroded by water.
- The impacts of off-road vehicle use in streambeds on fish habitats is largely unstudied, but the braided gravel of watercourses are common routes for off-road vehicles in the north.
- Experimentally induced off-road vehicle impacts tend to be conservative because the test vehicles have typically been unloaded.

Below are listed some effects of winter snowmachine traffic

- Compacted snow on snowmachine trails can retard the growth of spring plants by as much as two weeks, with measurable declines in the net productivity of forbes and bog shrubs.
- Snowmachine use over willow, dwarf birch, and Labrador tea at extreme temperatures (below -35°C) produces moderate to severe breakage of stems and trails visible in the summer.
- Early season travel with shallow snow cover is most damaging. Deep snow reduces impacts on vegetation.

Impacts to soils and vegetation are well documented. The actual significance of these impacts to wildlife is not so clear. Except in unusual circumstances, calculated net losses to habitat due to off-road vehicle trails are not great measured over an entire range, but may be highly significant in certain settings, such as in a wetland or meadow, or in a critical habitat used by a certain population. In some instances, the greatest habitat loss may occur by excluding wildlife from a road or trail corridor by the disturbance effects of traffic.

A significant effect of soil and vegetation damage is on the perceptions and experiences of backcountry users who desire a wilderness setting. Even if the off-road vehicle activity has ceased, visible scars on the landscape remain, which diminishes the values and interests of outfitters, wilderness recreationists and the wilderness tourism industry.

IMPACTS ON WILDLIFE

A large body of literature confirms the statements of resource managers who maintain that off-road vehicle use can produce three kinds of impacts on wildlife:

- stress from harassment or proximity to humans;
- displacement from habitats due to harassment or disturbance; and
- increased mortality due to the above or to increased hunter success.

The details and the dynamics of these effects vary with terrain, wildlife species, and the behaviour of the off-road vehicle user. Nor are off-road vehicle users the only recreational groups causing these impacts.

Harassment

Research shows that ungulates are highly sensitive to harassment from snowmachines. Moose and caribou can be susceptible to approach and chasing in open country and in deep snow. The effects of stress from this can increase mortality especially if energy reserves are low, as they frequently can be in the winter. Opportunities for summer harassment by ATVs are not as many for ungulates, but have been severe for birdlife, especially for nesting waterfowl.

Disturbance and displacement

It is less clear what produces a disturbance and displacement effect when no harassment is intended. Nonetheless, high levels of recreational off-road vehicle traffic do cause caribou, moose, and other wildlife to move to quieter locations. Noise, the proximity of humans and machines, and the number of vehicle passes per period of time are the contributing factors. Most displacement research has been done on elk. A similar effect on northern species is presumed.

Increased mortality

Losses due to harassment, disturbance, and displacement are difficult to estimate, but researchers believe they occur in the north based on research done on southern species (deer, elk, bighorn sheep). More certain is that off-road vehicles are a significant evolution in hunting methods and means which dramatically increases hunter success rates. Improved access into remote areas has resulted in localized overharvests of moose, caribou, sheep, and goats in several jurisdictions. In some parts of Alaska, increased harvest linked to off-road vehicle access is believed to be the significant factor in reducing moose bull to cow ratios, altering age structures by selective harvesting of large bulls, and loss of "refugia" (areas either difficult to access or protected by law which support game populations with little or no hunting pressure). The evidence linking access and hunting success is reflected in hunting regulations across the west and north where areas are closed to hunting after access has been improved and populations have declined. The Yukon is no exception.

Off-road vehicles are thought by some to distribute hunting effort and thus relieve pressure on more accessible and heavily hunted game populations. This has not been confirmed, and there is reason to believe that the effect may be to "clean out" or displace local game populations as soon as off-road vehicle access to a new area becomes generally known and used.

Snowmachines are generally thought to provide such an advantage to moose hunters so their use for this is often prohibited or discouraged by closing the season before the snow falls. Another reported effect of snowmachine use is higher mortality for rodents beneath the snow, when tunnels and food caches are collapsed and blocked by hard frozen tracks. It is also reported that predators use snowmachine tracks to increase their take of prey species. The significance of this is not known.

Summary

It should be apparent that in principle, most of the impacts of off-road vehicle use on wildlife can be avoided or mitigated. It is difficult to avoid damaging soil and vegetation with an ATV. This is mostly a function of the machine. But there are many ways in which impacts to wildlife can be reduced, since many of these are a function of the operator. Harassment can stop completely if off-road vehicle operators choose, and inadvertent disturbance can be reduced by avoiding important habitats, by avoiding certain places in certain seasons, by keeping to defined trails, and by limiting the number of vehicles per unit of time. Neither must game populations decline because of off-road vehicle-linked overharvests. There are many ways to allow off-road vehicle use and maintain acceptable harvest limits. These include permits, special seasons, and special regulations (such as limiting off-road vehicles for transporting meat only, or limiting off-road vehicles to accessing base camps only, or permitting them only to people with age or health limitations).

CONFLICTS WITH OTHER BACKCOUNTRY USERS

The backcountry is shared by many kinds of users in all seasons of the year. One division is between trappers and subsistence harvesters and everyone else. Another is between industrial operators and recreationists. A frequently noted division among recreationists is between hunters and non-hunters, but perhaps a more important one is between motorized and non-motorized groups. This division cuts across the hunting/non-hunting line and marks a serious potential for conflict. Off-road vehicle users

perceive their outdoor activities differently than non-users (Sheridan, 1979; Nash, 1980). Non-users see an inconsistency between using machines for transport and recreation in areas which are distinguished because they are remote and roadless. They cannot fathom how operating a machine can be a recreational experience in its own right. Understandably, off-road vehicle users see no such inconsistency.

Non-motorized recreationists (hunters and non-hunters) tend to be intolerant of off-road vehicles. They find the machines to be obnoxious and objectionable and recommend extreme restrictions such as banning or limiting them to small areas (Nash, 1980). Interestingly, off-road vehicle users tend to be tolerant of other backcountry users, probably because they are not seeking silence and a pristine environment. This is the so-called "one-way effect" in which off-road vehicles impair the satisfaction of non-users, while the off-road vehicle user is tolerant of, or even oblivious to, people on foot (Badaracco, 1976). Wilderness tourism operators, which in the form of "ecotourism" features non-motorized travel (backpacking, horse packing, canoeing, rafting, kayaking, skiing, dogsledding) finds it difficult to satisfy clients on routes frequented by off-road vehicles (or motorboats, for that matter).

Neither user group will go away; in fact, both are increasing. Off-road vehicles provide practical and recreational benefits to millions of people across North America, and non-motorized recreation and tourism is even larger and still growing. In the absence of management, conflicts between user groups become heated. In time, non-motorized groups tend to be displaced and ecotourism declines. However, a well developed body of management tools has developed over the past two decades in a largely successful attempt to accommodate both interests.

MANAGEMENT RESPONSES IN SELECTED JURISDICTIONS

EUROPE

Scandinavia and Siberia show examples of both extremes in managing off-road vehicles. Norway and Sweden quickly moved to regulate snowmachines as they first came onto the market and did the same with ATVs. Permits are needed to operate off-road vehicles (summer or winter) in these countries and are granted on a need-to-operate basis. Owners of mountain vacation cabins, for instance, can receive permission to transport supplies or materials in or out, but access is normally considered to be on foot or on skis. Reindeer herders, forestry workers and similar activities can receive permits, but recreational use of off-road vehicles is rare. Not many people own them. Since off-road vehicles never became established in these countries, there is little conflict between recreational groups and virtually no environmental damage or landscape scarring in backcountry areas.

In Siberia, large tracked vehicles and military-built 4x4s and 6x6s were issued for basic transport to reindeer collectives, hunting and trapping associations, and resource development ministries during the Soviet period. Few, if any, environmental controls were imposed. The result is evident from the air and on the ground. Despite the vast scale of the tundra, vehicle tracks are usually in view. Often, these are deeply rutted examples of subsiding permafrost with widespread detours to avoid soft spots. Forest trails are also common and are created as needed with little regard for vegetation and soils. A Russian observer remarked that if left unchecked, nearly everywhere will show signs of vehicle traffic, since the environment recovers slowly and the trails are constantly expanding.

ALBERTA POLICIES AND LEGISLATION

The Alberta government regulates the use of off road vehicles for hunting and recreation. It manages several categories of land. Provincial parks, governed by the Parks Act, exclude off-road vehicles. Wilderness areas and ecological reserves, governed by the Wilderness Areas and Ecological Reserves Act, exclude off-road vehicles. Forest Land Use Zones

(FLUZ) cover 60% of the province. They are governed by the Forest Act, which can regulate or prohibit off-road vehicles for a variety of reasons, including wildlife management, recreation management, and conservation of soil, vegetation, and watersheds.

In addition to these designated areas, wildlife management and hunting activities including off-road vehicle use are regulated under the Wildlife Act. Alberta's Off Road Vehicle Act enables licensing and has no bearing on off-road vehicle use.

The off-road vehicle topic has matured in Alberta. It is not highly contentious, unlike two decades ago. A Natural Resources Conservation Board helps to draft management plans for conservation units. Integrated Resource Management (IRM) plans have been supplanted in favour of a land use planning structure for provincial, regional, and site-specific levels incorporating IRM principles and broad public review. Well-formed land use planning processes guided by accepted conservation principles can be credited for largely resolving the worst of the off-road vehicle conflicts, although irritants between user groups remain.

Off-road vehicle restrictions are typically triggered by concerns relating to wildlife population dynamics, or to issues relating to recreation management. Wildlife habitat conservation is not considered to be well handled; only indirect measures are available through regulations relating to "wildlife control areas." Area closures and regulation receive public reviews and compliance is generally good if a total ban is imposed. Partial bans are not as effective. The greatest attention is directed towards 4x4s. ATVs and snowmachines have proven very hard to regulate except in cases of total bans, which tend to be enforced by non-motorized users.

The range of management tools includes:

- complete exclusion of motorized and non-motorized activities for any purpose;
- motorized and/or non-motorized activities permitted in a given area during certain seasons;
- restriction of motorized activities to designated trails or corridors.
- exclusion of motorized and non-motorized activities from environmentally sensitive areas;
- restrictions on how an off-road vehicle may be operated: limits by time of day, season, or what may be carried (such as firearms).

BRITISH COLUMBIA POLICIES AND LEGISLATION

British Columbia relies mostly upon its Wildlife Act to regulate off-road vehicle use. This act permits regulations governing the condition under which all motorized vehicles, including off-road vehicles, boats, and aircraft, may be used for hunting, trapping or wildlife viewing. The primary tools are the prohibition of motor vehicles in specific wildlife management units, the exclusion of vehicles on designation roads, or conversely, permitting vehicles only on designated roads.

The Forest Act can restrict off-road vehicle use and is occasionally invoked to protect replanted areas. In forest recreation sites off-road vehicles may be prohibited.

Managers characterize B.C. as using an ad hoc, piecemeal use of site-by-site regulations. No agency appears eager to accept the initiative for this topic, which is considered to be highly contentious. Typically, proposals to regulate off-road vehicles come from regional special interest groups. In agency hearings and land use planning processes, many special interest groups participate. The ATV and snowmachine groups especially want to be seen as responsible and co-operative with authorities. No clear authority seems to have responsibility for resolving user group conflicts, nor are there accepted principles to guide the decisions.

Northeastern B.C. has the biggest off-road vehicle hunting closures. Here, an extensive network of tote roads and cutlines gives widespread access to the backcountry, and wildlife populations have declined rapidly. Bans tend to be used more than partial limitations.

NEWFOUNDLAND POLICIES AND LEGISLATION

In 1994, Newfoundland enacted the "All-Terrain Vehicle Use Regulations" under the Motorized Snow Vehicles and All-Terrain Vehicles Act. This was a comprehensive approach to a problem which had received growing attention: the indiscriminate use of ATVs in sensitive areas. Wetlands, bogs, and tundra

had been particularly damaged in Newfoundland as ATV ownership climbed from a few hundred vehicles in the late 1970s to 35,000 vehicles in 1993. Previous regulations had little effect and concerns about wildlife, landscape damage, and user conflicts mounted.

The approach taken was to prohibit off-road vehicles from sensitive areas (bogs, wetlands, meadows and tundra), and restrict them to more durable areas such as dry, mineral forested soils, beaches, existing and/or abandoned roads and railway corridors and licensed ATV trails constructed under the new regulations. Any individual could apply for a license to build an ATV trail, and criteria were given to describe acceptable purposes and construction and maintenance standards.

In 1996, a regulation review gave a sense of how the approach was working. In general, bogs seem to be recovering and regenerating, but the following issues were raised.

- Some advocated that ATVs be permitted to retrieve game.
- Enforcement needed to be refined. More discretionary power was needed by officers who had no options other than to ignore an offence or seize a vehicle. Similarly, judges needed the power to return vehicles. It was felt that these inflexible and extreme penalties inhibited enforcers.
- Conflicts persisted between motorized and non-motorized hunters.
- Fishers for the most part objected to licensed ATV trails increasing access to fishing places.
- Hydro corridors needed a separate policy. Companies did not want or need to maintain to the standards of a licensed trail,
- Regulations needed more regional input and refinement to local conditions.
- Enforcement agents should walk, too.
- Miners should not be exempted. Resource development causes more damage than ATVs. Why single them out?

The consensus is that the approach is successful as indicated by recovering damaged lands and by the reduced rate of new damage. A broad program of public consultation is used to refine the regulations.

ALASKA POLICIES AND LEGISLATION

Alaska may offer the most varied examples of off-road vehicle management approaches. Several governments and agencies administer lands and resources in the state. These include:

- federal government: National Parks Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service;
- State of Alaska: Department of Natural Resources (various agencies), state parks; and
- native corporations and regional governments.

Alaskan society is comprised of many interests and viewpoints regarding natural resource values. Off-road vehicle use has been a focal point for many controversies. The motorized/non-motorized debate cuts across several other divisions:

- rural/urban;
- preservation/development;
- native/non-native;
- state/region/national;
- parks/locals;
- subsistence hunting/recreational hunting; and
- hunting/non-hunting.

The many and varied viewpoints and the patchwork pattern of land ownership have challenged land managers to develop coherent policies which meet resource management objectives which are generally supported and can be enforced. The growth of off-road vehicle use in Alaska has been explosive. In 1988, Anchorage alone had some 16,000 snowmachines and 11,000 ATVs. The number of ATVs is estimated to have doubled by 1996. In addition to sport and subsistence hunting, recreational use of off-road vehicles is widespread. A large literature exists on the type, location, and evolution of problems and conflicts caused by off-road vehicle use.

The two agencies most involved in off-road vehicle management issues are the Alaska Department of Fish and Game (ADFG), and the U.S. National Park Service (NPS). With advice from a Board of Game, ADFG uses several management tools to manage off-road vehicle use on state lands. These include Controlled Use Areas in which some or all off-road vehicle uses might be restricted or prohibited for hunting. In State Game Refuges, and in Critical Habitat Areas, off-road vehicle use for any purpose may be restricted as needed. The State Parks unit of the Department of Natural Resources regulates off-road vehicle use in some parks and recreation areas. Restrictions include total bans, seasonal trail closings, zoning to separate off-road vehicle and non-motorized trails, and time-sharing.

Federal land management agencies include the Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service, and the National Park Service. The BLM does little to regulate off-road vehicles since it has a generalized "multiple use" mandate on its substantial holdings. In the National Wildlife Refuges, managers have the authority to regulate or prohibit off-road vehicle use if warranted by management concerns. An ongoing dispute is whether off-road vehicles are a bona fide "traditional technology" for subsistence hunting. Federal authorities have ruled that they are not, but this has not been tested in court.

The U.S. National Park Service has extensive experience in different forms of off-road vehicle management and in mitigating or repairing the results of past abuses. In the view of the former Superintendent of Katmai National Monument, off-road vehicles cause "the largest environmental impacts to national parks in Alaska." Managers in Katmai demonstrated that the widespread use of off-road vehicles by local villagers in the National Monument could be eliminated. The key was public education and engagement which was "incremental, sensitive, focused, fair, firm, and consistent." Interestingly, these gains were lost by subsequent managers who failed to maintain the needed public presence and enforcement.

Wrangell-St. Elias National Park has the most severe problems with off-road vehicle use. It has sophisticated and numerous user groups of locals and Anchorage visitors engaging in sport and recreational hunting, travel to in-holdings, and recreational riding. Efforts here focus on zoning off-road vehicle use to specific trails, hardening or relocating trails from sensitive areas, and reclaiming damaged trails. Park managers have an ongoing public process which can see natives, whites, locals, visitors, and lobby groups staking various positions.

YUKON POLICIES AND LEGISLATION

On several occasions since the early 1980s, the Yukon has addressed off-road vehicle restrictions as a part of managing hunting access. It recognized that off-road vehicle access is directly connected to resource road construction and, in 1988, drafted a proposed access management program. Closures of some game management units and the creation of designated off-road vehicle trails are some of the steps taken to date. The Yukon has not yet addressed off-road vehicles in the broader context of other backcountry interests and values.

Three acts could furnish a means for addressing off-road vehicle access and operation.

- The Highways Act provides for the closing of roads and trails. There is no specific policy addressing the exercise of this power, but in the provinces, similar legislation permits designated resource access roads to be restricted to industrial users.

- The Wildlife Act empowers the Yukon to manage wildlife and wildlife habitat. Section 165(1) allows regulations respecting the use of vehicles for any purpose relating to hunting. This provision could be used for a wide range of measures including full, partial, seasonal, or daily closures of roads and trails, creating no hunting corridors and areas, and regulating how or if firearms can be transported. Section 178 provides for protected habitat areas and the ability to regulate activities which may damage habitat within a designated area. This provision could be used to limit the spread of trail networks.

- The Environment Act provides for wilderness management areas and forest management areas for which management plans may-drafted and implemented. In Part 12, the act provides for regulations to omplement management plans. At present, the practical application of this act to off-road vehicle issues would be negligible, since it bears only on the small portion of land transferred to Commissioner's control.

Between the Highways Act and the Wildlife Act, the Yukon appears to possess tools which, in principle, could bear on many off-road vehicle impacts and be employed in the near term for at least some situations. The Environment Act would appear to offer even greater latitude if the authority to manage lands and forests were transferred from the federal government to the Yukon government.

Regulating snowmachine use is more problematic at this time, since the impacts to wildlife are rarely connected to hunting. Mechanisms for regulating the impacts of snowmachines on wildlife may include establishing special management areas, or declaring the use of snowmachines to be a form of "wildlife harassment" in specified areas and circumstances. The Environment Act will provide more capabilities after devolution.

SUMMARY OF YUKON INFORMATION

An overview portrait of off-road vehicle use and impacts in the Yukon was obtained from a sampling of resource managers, biologists, trappers, wilderness guides and outfitters. Information about each area of the Yukon was supplied. Although the portrait is not detailed, a general outline can be seen and is summarized below.

Nearly every type of impact and problem related to off-road vehicle use which has been reported elsewhere has occurred in the Yukon. In this respect, the Yukon is not a unique place. The dynamics of user groups acting and interacting on lands and resources is much the same here as anywhere else. One implication is that we can indeed learn from the experiences of similar jurisdictions.

Trail network

Off-road vehicle use is a direct result of the Yukon's network of resource access roads. The surveys and interviews show that the vast portion of off-road vehicle use occurs on mining and forestry roads and trails. As new trails are built, off-road vehicle use expands. Few trails are ever abandoned; indeed trails abandoned in the 1960s and earlier have been reopened unless they are blocked by some impassable natural barrier. Across the Yukon, it was reported that off-road vehicle use occurs on virtually every resource access trail in each district, summer and winter.

In most districts, the trail network is constantly expanding in the manner reported in Alaska. ATVs use existing roads and trails as jump-off points to push into new country. As these new trails become established and known, the process of extending is repeated. This is reported particularly for open areas such as alpine and buck-brush. Off-road vehicle operators can make great efforts to gain access to open areas from an existing road. Once into the alpine or sub alpine zones, the off-road vehicle network multiplies. Except for Whitehorse, most off-road vehicle use is in support of hunting and fishing.

Environmental concerns

Environmental damage on existing resource roads and trails occurs by rutting of soft spots and steep grades and at water crossings. More damage occurs

on former winter roads now used by ATVs which often traverse bogs and wet places. Each district reported increasing and growing damage to alpine and buck-brush areas in the form of tracks made visible by broken and crushed vegetation and compacted soils. It was suggested that some of the most vigorous damage has been done by off-road vehicle operators making strenuous efforts to remove meat from difficult-to-reach kill sites.

Wildlife concerns

Wildlife disturbance (winter especially) and localized overhunting were reported in each district. Although several people thought that off-road vehicles distributed hunting pressure and were thus beneficial, others disagreed. Two contrary viewpoints were offered.

- Off-road vehicle hunting impacts added to pressure on populations already affected by trail corridors, possibly by adding to the number of hunters who would not otherwise get out.
- Off-road vehicle hunting impacted previously unhunted populations and reduced them disproportionately.

Reports from each district identified locations of specific concern.

Conflicts

Conflicts with non-motorized hunters were reported particularly in sheep areas having a strong tradition of walk-in hunts. It was implied that non-motorized hunters (including those using boats and airplane access) are being displaced. Conflicts with other user groups were reported in each district. Only in Whitehorse were conflicts with non-motorized recreationists considered serious. Wilderness guides reported that their level of conflict was low because they avoided or had abandoned areas used by off-road vehicles. Those guides offering trips in the Whitehorse area reported difficulty in offering a quality product free of mechanized noise. A concern voiced by wilderness guides and outfitters is that off-road vehicle use must not spread into what is now considered to be remote areas (that is, those presently accessed by air, river, or extended horse trail).

Trapline concerns and conflicts were reported in all districts except one. Summer use of ATVs caused little comment, but recreational use of traplines is a common concern especially around Whitehorse and Dawson City. The possibility of snowmachine tourism is a trappers concern in both areas. Wildlife managers are concerned that the objectives of the Southern Lakes Caribou Recovery Program may not be achievable because of the combined effects of habitat loss and recreational snowmachine use in the Marsh Lake-Tagish-Carcross areas.

Yukon trends

How serious are the problems reported? Opinions varied by district and observer. This likely reflected variations in the actual situation, the information available, and the values and perceptions of the informant. For all topics, opinions in rural communities were mixed between "not yet serious, but be concerned" to "serious." In Whitehorse-Southern Lakes, the consensus was "serious and getting worse." In all areas, it was reported that situations of conflict with trappers, non-motorized hunters and recreationists were often easily resolved, but were sometimes viewed by the people involved as very serious. Threats under the Criminal Code of Canada have been reported.

There was universal agreement that off-road vehicle use is growing and that impacts will spread and deepen. Here are some trends.

- An estimate abstracted from dealers is that there are between 3,000 and 4,000 ATVs in the Yukon and some 9,000 to 10,000 snowmachines. Sales are reported to have been strong in the last few years and are expected to grow.
- Snowmachine tourism is planned by several operators, and a Yukon portion of the TransCanada Trail has been planned to accommodate snowmachines. This may increase the profile of the Yukon as a snowmachine destination. It may also attract off-road vehicles to what is intended to be a walking, biking and horse trail in the summer.
- Ecotourism and wilderness tourism will continue to grow.
- Local participation in non-motorized outdoor recreation is growing, in the opinion of clubs and equipment retailers.

- Renewable Resource Councils are facing demands to address access questions in favour of local harvesters.

Medium and long-term risks

From the trends, it can be predicted that impacts will increase in the three primary areas:

- soils and vegetation damage;
- wildlife harassment, disturbance, and loss; and
- conflicts with other users.

In the short term, the risk of a crisis or even a major controversy is not great. Many of these impacts will most likely grow incrementally. This bodes ill for the medium and long term. Incremental problems typically reach a serious threshold before they are perceived, and often are allowed to deteriorate while solutions are pondered. This is especially true for problems involving environmental degradation. In these instances, the current administration will bear criticism for mismanagement and short-sightedness, even though the roots of the problem were from long before. Even more serious is the risk that problems will be costly to repair or even impossible to reverse.

Conflicts between users can stay at low levels until a precipitating incident or initiative focuses attention. This might occur as an especially unpleasant confrontation between competing groups, or it might be prompted by a management initiative, such as a park plan.

The following can be predicted in the absence of any management efforts.

- Trail networks will continue to expand and the condition of these trails will deteriorate.
- Human impacts of all kinds on wildlife will increase as demand for hunting and wildlife viewing increase. This will involve a wide cross-section of society within the Yukon and across Canada. Off-road vehicles will be seen to be a critical component in this matter.
- Conflicts between recreational user groups will increase, spread to new areas, and intensify.

ANALYSIS

The Yukon government has accepted principles of resource stewardship, landscape conservation, and equity between resource users as reflected in the Yukon Conservation Strategy, the Wildlife Act, and the Environment Act.

The research shows that these principles and a range of natural resource values are compromised by the impacts presently caused by off-road vehicle use in the Yukon. There is every indication that this will worsen over time and that corrective measures will be increasingly difficult to enact with the passage of time. Further, the consequences of impacts permitted by inaction may be long lasting. Therefore, management measures are a sensible and responsible reaction. The Yukon would appear to have the legislative authority to address much if not all of these impacts at this time, and nearly complete authority can be anticipated after devolution.

The research also shows that off-road vehicles have become an accepted and legitimate use of public lands. The experiences in Alberta and in parts of Alaska show that appropriate and effective management strategies can be devised which accomplish conservation goals and provide satisfactory outlets for off-road vehicle use. The essential elements in devising an effective approach are:

- broad consensus on conservation principles and objectives;
- common understanding of the values at risk in uncontrolled off-road vehicle use;
- common understanding of the nature and extent of problems;
- public involvement in devising management tools and approaches; and
- local and community participation in applying management measures

Ideally, off-road vehicle management should be a part of an overall access strategy which addresses a root problem in the proliferation of access roads without regard to other resource interests. Even without an overall access strategy, a sensible program can be devised for managing the use of existing roads

and trails and governing how new ones are created by non-industrial users. Since hunting is the primary purpose of backcountry off-road vehicle use, substantial parts of the problem can be addressed with existing tools under the Wildlife Act. Options for management efforts include area-specific regulations drafted with the assistance of local bodies and Renewable Resource Councils, or Yukon-wide regulations for categories of lands such as alpine zones or wetlands.

Regulating snowmachine use is more problematic at this time, since the impacts to wildlife are rarely connected to hunting. Mechanisms for regulating the impacts of snowmachines on wildlife may include establishing special management areas, or declaring the use of snowmachines to be a form of wildlife harassment in specified areas and circumstances.

FURTHER STEPS

Public acceptance is critical to the success of off-road vehicle management efforts. The following steps are suggested based on the research and its analysis.

1. Confirm intent within the department and with the Yukon Fish and Wildlife Management Board to address off-road vehicle management issues further.
2. Confirm this intent with Cabinet.
3. Identify specific issues for further research or consultation including management options and issues for First Nations people and for First Nations lands).
4. Define objectives for public consultation, design process.
5. Begin and conduct a process of consultation with affected parties, including Renewable Resource Councils, First Nations, and non-governmental associations of recreationists, resource-users, environmentalists and merchants.
6. Design an implementation strategy.

Objectives for an effective consultation process on this topic should include the following points.

- Problem awareness: What is the problem? Why is it a problem? Where is the problem? Who should be doing something about it? What are the limits of acceptable change?
- Option awareness: Consequences of no action, what other jurisdictions are doing.
- Generate criteria which describe best solutions for the problems.
- Principles for when and how to apply solutions.
- Generate optional solutions.

It is often effective to discuss these four objectives with each affected party individually, and then convene a workshop to collectively weigh and evaluate the optional solutions.

APPENDIX 2: SELECTED REFERENCES

There is a great deal of literature on off-road vehicle impacts and management responses. The essential biophysical and environmental work was completed in the 1970s and early 1980s. Since 1985, research has focused on social impacts and on reviewing management techniques. Below is a sample.

Alaska Department of Fish and Game, 1996. Off-road vehicle and snowmachine use in Alaska: A report to the Alaska Board of Game.

Badaracco, Robert, 1976. ORVs: often rough on visitors. Parks and Recreation, vol. 2, no. 9.

Ballard, W. and Larsen, D., 1987. Implications of predator-prey relationships to moose management. *In:* Swedish Wildlife Research reprint. p. 581-602.

Bane, Ray, 1991. Off road vehicle issues in Alaska national parks. Report to Regional Director, U.S.N.P.S. Anchorage.

Boyle, Stephen, 1985. Effects of nonconsumptive recreation on wildlife: a review. Wildland Society Bulletin 13.

Bureau of Land Management, 1988. National Environmental Policy Act handbook. U.S. Dept. of Interior: BLM Handbook H-1790-1.

Bureau of Land Management, 1987. Surface disturbing activities in Alaska: A guide to technical aspects of mitigation and reclamation. U.S. Department of the Interior, Anchorage.

Carey, J. et al., 1996. Sheep management guidelines. Yukon Department of Renewable Resources.

Carey, J. and Tousignant, J., 1997. Views from the mountain: What resident Yukon sheep hunters have to say. Yukon Department of Renewable Resources.

Frid, A., 1995. Dall's sheep of the Killermun Lake region: Ecological and behavioural data in relation to mineral exploration. Prepared for Yukon Department of Renewable Resources.

Frid, A., 1998. Responses to helicopter disturbance by Dall's sheep: Determinants of escape decisions. Prepared for Yukon Department of Renewable Resources.

Gartner Lee Ltd., 1994. Snowmobiling and the environment. Ontario Federation of Snowmobile Clubs.

Gasaway et al., 1992. Wildlife monographs: The role of predation in limiting moose at low densities in Alaska and Yukon and implications for conservation, Wildlife Society.

Happe, P.J., Shea, K.E. and Loya, W.M., 1998. Assessment of all-terrain vehicle (ATV) impacts: within Wrangell-St. Elias National Park, Alaska. U.S. National Park Service.

Kevan, P.G. and Forbes, B.C. Vehicle tracks on high Arctic tundra: their effects on the soil, vegetation, and soil arthopods. Journal of Applied Ecology, no. 32, p. 655-667.

Labonte, J. et al. Moose dispersal and its role in the maintenance of harvested populations. Journal of Wildlife Management. vol. 62, no. 1, p. 225-235.

Larsen, B. et al., 1989 (July). Causes and rates of moose mortality in the southwest Yukon. Journal of Wildlife Management, vol. 53, no. 3.

Larsen, B. et al., 1989. Limiting factors on moose population growth in the southwest Yukon. Yukon Department of Renewable Resources.

Larsen, B. and Ward, R. Moose population research and management studies in Yukon. Reports and data from 1983 -1996. Yukon Department of Renewable Resources.

Lodico, Norma Jean, 1973. Environmental effects of off-road vehicles: A review of the literature. Office of Library Services, U.S. Dept. of Interior, Washington, D.C.

McCool, Stephen, 1981. Off-road vehicles in national park areas: Some information needs. Leisure Sciences, vol. 4, no. 3.

McCool, Stephen, 1977 (fall). Perspectives on managing the off-road recreation vehicle. Western Wildlands.

Moss, Wendy, 1989 (July). The rights of trapline holders. Research Branch, Library of Parliament.

Mychasiw, Len and Hoefs, Manfred, 1988. Access-related impacts of backcountry roads to wildlife and management approaches to mitigate them. Yukon Department of Renewable Resources.

Shea, Kelly, 1997. Study plan for all-terrain vehicle mitigation techniques: ATV impacts study. Manuscript for Wrangell-St. Elias National Park, U.S.N.P.S., Alaska.

Sinnott, Rick, 1990. Off-road vehicles and hunting in Alaska. A report to the Alaska Board of Game. Alaska Department of Fish and Game.

Slaughter, Charles et al., 1990. Use of off-road vehicles and mitigation of effects in Alaska permafrost environments: A review. Environmental Management, vol. 14, no 1.

Thompson, Andy and Rueggeberg, Harriet, 1988. Wildlife habitat protection in the Yukon. Yukon Department of Renewable Resources.

Warren, Charles, 1979. Off-road vehicles on public land. U.S. Council on Environmental Quality. Washington, D.C.

APPENDIX 3: PROPOSED YUKON STRATEGY

MANAGING OFF-ROAD VEHICLE IMPACTS ON FISH AND WILDLIFE AND THEIR HABITATS

Introduction

In response to public concerns expressed to the board about increasing use of off-road vehicle, the Yukon Fish and Wildlife Management Board formed an off-road vehicles working group. Building on an initial report by the Yukon Department of Renewable Resources, the group commissioned a second report on off-road vehicle use in the Yukon. This was done to provide a background upon which a strategy to manage off-road vehicles would be based.

Using the information from the reports, the board held a brainstorming session which included members of the public involved with off-road vehicle use. The results of that session are provided here as the proposed action plan for the Yukon. The board welcomes public comments on this strategy and will be updating and reviewing it annually.

MANAGEMENT ISSUE	OBJECTIVE	ACTION
Part 1: Off-road vehicle operator		
Education		
Off-road vehicle operators may not be aware that their activities can cause damage or disturbance to habitats	Help off-road vehicle operators appreciate the fact that their machines can cause disturbance and damage under certain conditions and at certain times	• Summarize types of off-road vehicle disturbance and damage **YDRR/FN** • Employ effective means of communication with off-road vehicle operators **YDRR/ YFWMB/FN**
At present, off-road vehicle operators are not aware of areas where it is okay to operate off-road vehicles and areas where off-road vehicles may be a problem or where they are prohibited	Inform operators about areas that are recommended for off-road vehicle use, sensitive to disturbance from off-road vehicles or prohibited for off-road vehicles	• Produce off-road vehicle/snowmobile guide as a pilot project for Whitehorse area and monitor effectiveness of communication and voluntary compliance **YDRR/FN** • Develop a pilot project for the Trans Canada Trail within the Yukon to monitor effectiveness of communication and voluntary compliance **YDRR/FN**
Legislation		
Instances of harassment of wildlife by off-road vehicles, especially snowmobiles, have been reported	Prohibit harassment by people operating off-road vehicles	• Enforce Territorial Wildlife Act **YDRR**
Certain fish and wildlife areas are sensitive to off-road vehicle use depending on season and location	Develop legislative tools for managing off-road vehicle use	• Summarize effectiveness of Territorial Wildlife Act, Area Development Act, SMA, HPA, YPAS and FN Acts **YDRR** • Provide background on the likely nature and effectiveness of an off-road vehicle licensing act **YDRR**

YDRR Yukon Department of Renewable Resources
FN First Nation
SMA Special Management Area
HPA Habitat Protection Area
YPAS Yukon Protected Area Strategy
RRC Renewable Resources Council
FWMB Fish and Wildlife Management Board

APPENDIX 3: PROPOSED YUKON STRATEGY

MANAGEMENT ISSUE	OBJECTIVE	ACTION
Implementation		
Off-road vehicle management is already being done in other Canadian jurisdictions	The Yukon should avoid mistakes that may have already been made and addressed in other parts of Canada	• Contact other jurisdictions and ask them: a) If you could wind back the clock what would you have done? b) How well is your management strategy working? c) What triggered your government to begin off-road vehicle management? **YFWMB**
Part 2: Fish and wildlife habitats		
Some parts of the Yukon are at risk from off-road vehicle disturbance while there may be others that are vulnerable to disturbance and damage	**Potential site-specific risk**: - Document areas that are vulnerable to off-road vehicle disturbance **Known site specific risk**: - Protect fish and wildlife populations and habitats from off-road vehicle disturbance	• Identify important habitats through wildlife, forestry, land use, SMA, HPA, YPAS plans **RRC** • Intervene in review and permitting processes to ensure that impacts of off-road vehicle activities are taken into account **RRC/FWMB** • Educate the public about what is fish/wildlife disturbance and habitat damage and where they can report it **YDRR/FWMB/FN** • Investigate local reports of off-road vehicle risk or damage or disturbance **RRC/FWMB** • Produce plans to protect areas at risk (include historical context of status of area and monitoring of effectiveness of plan) **RRC/FWMB** • Summarize options for protecting areas **YDRR/FWMB/FN**
New off-road vehicle trails are being made every year in the Yukon	The cumulative impacts of increasing trails in certain areas must be documented to ensure they do not cause problems for fish and wildlife	• Ensure that governments and organizations seriously consider the impacts of building new trails **YDRR/YFWMB/FN** • Ensure that review and permitting processes consider the potential impacts of off-road vehicle use of new roads and trails **YDRR/YFWMB/FN**

PUBLIC RESPONSE: How would you manage off-road vehicles?

The Yukon Fish and Wildlife Board is seeking input to the future management of off-road vehicle impacts on fish and wildlife and their habitats in the Yukon. This is a pretty tricky subject and we are really just getting started with it. It was felt that merely producing the report would be doing a disservice to the public and that it would be better to provide a proposed action plan for public comment. So, if you have some opinions and ideas we would certainly like to hear from you. Send your comments to:

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